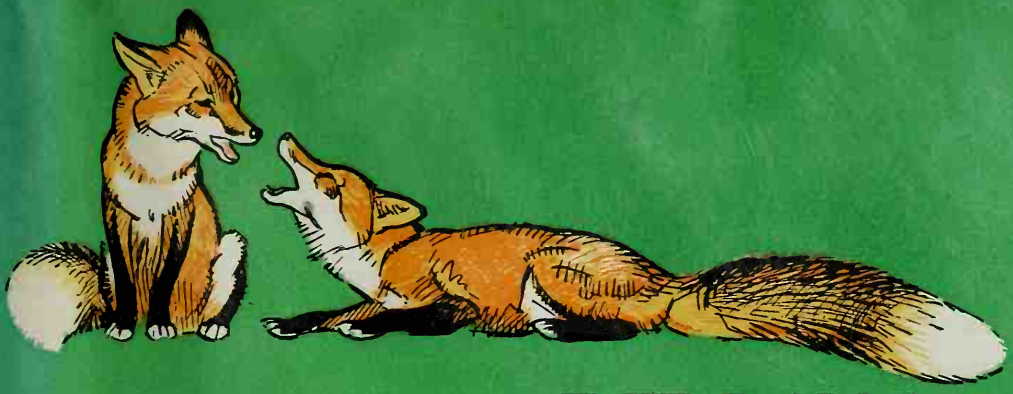
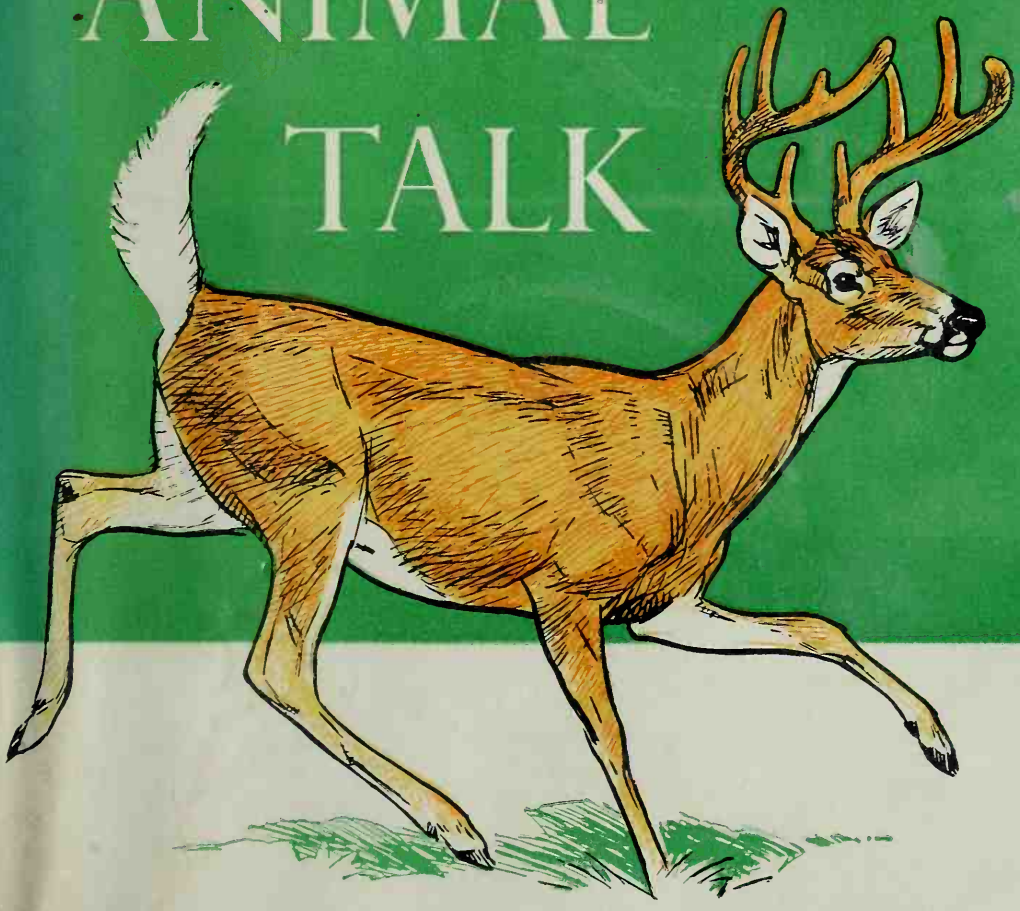


HOW TO UNDERSTAND ANIMAL TALK



by VINSON BROWN

with drawings by WILLIAM D. BERRY

HOW TO UNDERSTAND ANIMAL TALK

By VINSON BROWN

Everyone interested in animals knows that some animals "talk"; that is, communicate their feelings and wishes quite unmistakably. It is not so well known that practically every animal has some way of expressing itself to other animals and to humans.

The common animals — mammals, birds, reptiles, amphibians, fish and insects — of the United States and Canada are all in this book. Expressive dogs and unpredictable cats; sensitive horses and curious cattle; chickens, turkeys, ducks — these familiar individuals contrast with weasels, otters, foxes, wolves, sea lions, bears, raccoons, the wild hoofed ones, rodents, birds, even reptiles, fish, and insects. All have their special ways of "talking"; that is, of communicating. Who can deny there is meaning in a bull alligator's bellow or that a school of fish responds to a signal? And since the bees have a language can there be any doubt that other insects have theirs?

This book tells how to sharpen your senses in order to detect the language of animals and how to interpret what they are saying with sound, movement, and sign. It will guide you into a secret world filled with possibilities for better understanding among all living things.

This is a Junior Literary Guild selection, chosen as an outstanding book for older readers (B Group).

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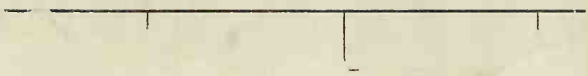

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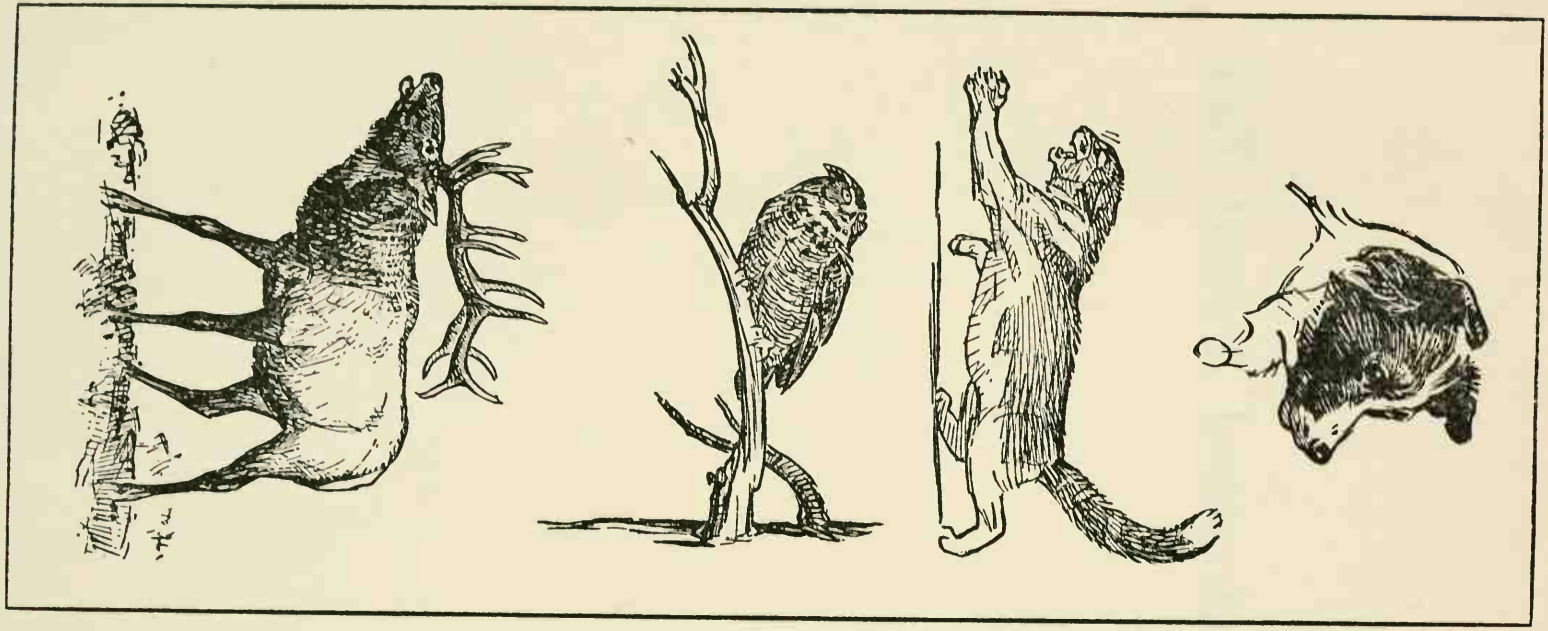

How to Understand

ANIMAL TALK

by

VINSON BROWN

with illustrations by

William D. Berry

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To my mother-in-law, MRS. LETITIA BLACK,
who has pioneered in the Colorado wilderness,
loves animals,
and understands their talk.

Acknowledgments

I wish to acknowledge the help received from the books listed in the Bibliography; from John Rood, for his report on shrew language; from Mrs. Letitia Black, for her accounts of animal languages on a Colorado cattle ranch; from Dr. J. Starker Leopold, for suggestions and ideas; as well as from Dr. Stanley Mulaik, who let me listen to his records of animal sounds, and from my wife, Barbara Ann, who relieved me of other work so I could write this book.

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Preface

Everyone knows that animals, with rare exceptions, do not use speech as humans do. They show emotions by sounds, movements, smells and even tastes, but not in *spoken* ideas in the sense that men do. A dog could not say to another dog: "I saw you downtown yesterday with your master." Rather, by wagging his tail, he expresses the emotion: "I am glad to see you now!"

Animal talk is almost entirely emotional talk of the kind we make when we grunt with pain or move our facial muscles into a frown or smile. It is largely talk about the present, without past or future. As an expression of emotions, on the other hand, it is usually far more complex and subtle than the rather rare emotional talk of men, and for this reason large parts of it often remain mysteries to us.

This book is the result of years of research and field observations, but I could have spent several lifetimes studying animal languages, and still know only a small fraction of what there is to know. I have studied many books on the subject, and several of these are listed in the bibliography at the end of this book. The reader should understand, however, that the opinions expressed of the meanings of various animal languages are primarily my

opinions and that some of them may very well differ from those of other observers. I have tried to think carefully of what each animal means to express in relation to its own particular emotions and needs. I hope that the book will be both helpful and stimulating to all those who are interested in the out-of-doors.

How to Understand Animal Talk

CHAPTER I

Entering into a Secret World

In the beginning, say some of the old legends, all the animals could talk and think just like men. Then somehow, through the foolishness of one animal or another, a catastrophe came and they lost this ability. Other legends say that once men knew the language of animals, and could converse easily with them, but some supernatural force punished men for their foolishness by taking this magic ability away from them. Primitive tribes even to this day send out their young men to make contact with certain animals, to learn their language and receive magic power from them.

Once in the jungles of Costa Rica near Punta Burica I watched an Indian named Pi-tin-tin call wild animals and birds out of the forest. So perfectly like the calls and whistles of the wild creatures were the sounds he made that many creatures came to within a few yards of us, calling in answer.

If we were like Pi-tin-tin or Mowgli, the boy of Kipling's *Jungle Book* who was raised with the wolves of India, we would have the feel of the wilderness in our bones and it would be fairly easy for us to pick up the languages of animals. But most of us have lived much of our lives between four walls and have had our senses

blunted by too many civilized smells and noises. It will not be easy for us to enter this secret world of animal talk, but it will be fun trying.

To understand animals successfully, we must feel close enough to them to catch their feelings and thoughts by a kind of mental telephone system. When we are close enough to animals in this way, they feel friendly towards us and often teach us many things that they would keep completely hidden from an unsympathetic person.

Furthermore, we must learn to listen. The person who can go into the woods or fields alone, be quiet, and listen, draws from the world of nature an inner strength and wisdom that will serve him all his life. Be quiet, very quiet, and listen intently. Who knows what strange secrets you may discover?

Learn to watch carefully. The eyes of the ordinary city dweller are not focused to the movements of animals, wild or tame. You must train yourself to sit or walk quietly and keep your eyes alert to every movement around you. Most animals' movements, even very tiny movements and the expressions in their eyes, have meanings.

Try to revive that sense that man has almost lost, the sense of smell. All sorts of strange little tales come down the wind to your pet dog, but to you they mean nothing. You can help yourself a little by wetting your nose with your finger and sniffing deeply. Keep trying and you will learn gradually to recognize some of the stronger scents of woods and fields.

To help you put sounds, smells, and animal signs into separate types so you can more quickly understand their meanings is one of the primary purposes of this book. Animals make different sounds at mating time than at

other times of the year. Herd and pack sounds are different and have different meanings from individual animal sounds. Sounds of rage and fear or of warning must be separated from each other and from other sounds. Animal movements and smells fit into different types too. As you learn about the languages of different animals in this book, notice the many different ways and meanings of animal talk and learn to recognize these in the wild.

One day a pet cat came to a friend of mine and began to rub against his legs, miaowing in a peculiar way. When he paid no attention to her, she nipped his leg very gently and miaowed more loudly than ever. My friend was naturally kind to animals, so he said, "What is the matter, Kitty?" — patted her — and listened to her. Her miaow rose in crescendo and, rising on her hind legs, she reached up almost imploringly toward him.

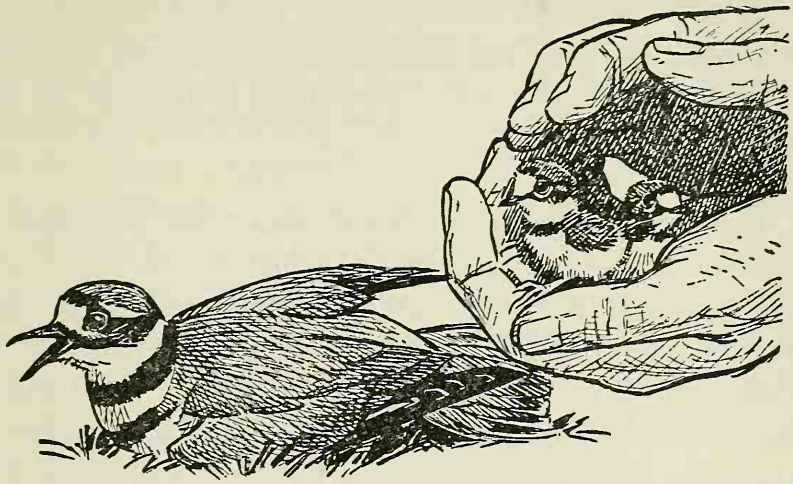
He decided that she was soon going to have her kittens. So he found a wooden box and prepared a nest in it of old clothes. He set the box on the back porch and the cat immediately jumped into it. She turned around about three times to get the feel of it, and then jumped out with a loud purr and began to rub against his legs. As plainly as possible she was saying "Thank you!" Sure enough, that night she had nine kittens!

Recently on our ranch I heard a mother killdeer calling down by the fence where the overflow from our water tank keeps the grass and weeds green all through the year. This beautiful white-and-black-marked shore bird was crying "Kee-dee-dee!" over and over. There was a soft, gentle, encouraging inflection in the sound that roused my curiosity, so I came down very quietly to see what was going on.

Some tiny baby killdeers, scarcely more than fluffs of black and white, were being urged by their mother to hunt insect food with her among the weeds. But the instant the mother became aware of my presence, the tone of her voice changed. The "Kee-dee-dee!" took on a high, frightened sound and the babies scattered among the grass, seeking the best shelter they could find. Two of them ran in my direction and I picked them up.

Again the mother's voice changed. This time the "Kee-dee-dee!" expressed pain and helplessness. The mother was across the fence from me dragging her wing on the ground, acting as if severely wounded. When I paid no attention to her, she flew closer to me and again dropped to the ground, crying piteously and dragging her wing.

I approached the crying mother and set the tiny killdeers free. Away they rushed through the grass, under



the fence and away from me. When the mother was sure they were safe, she stopped her pitiful cries and her wounded act. Into the air she sprang and winged swiftly to where the babies were. As I walked back toward our house, I heard her triumphant cry: "Ki-dee-dee! kee-dee-dee!" — still the same apparent sounds, but what a difference in the inflection!

We can translate her messages into human words somewhat as follows: (*First*) "Come, children, come; here is something good to eat!" (*Second*) "Look out! An enemy is coming; scatter and hide!" (*Third*) "Look over here, Mr. Man, see how wounded I am. If you would chase me and leave my babies alone, you could catch me for sure!" (*Fourth*) "How glad I am! How glad I am! My babies are safe! I fooled the man!"

The killdeer language by inflection is a language of emotions, emotions that are comparable to ours but which we can express only crudely in words. The meaning to the killdeer of these cries is far richer than it is to us, so that always in our attempts to understand we will fall

short of the full and true meaning. Nevertheless, through sympathy and love and careful observation, we can come to know much about the emotional languages of wild creatures.

This book gives information about the languages of representative common animals that live in the United States and Canada. Naturally, you will occasionally hear and see animals whose languages are not described in this book. But, if you study the book carefully, you will be much better prepared to understand even such unknown languages. So, if you read about the language of one kind of mouse, you will have knowledge that will help you understand similar kinds.

The main thing to remember is that there are usually differences between the languages even of animals that are closely related. One kind of mouse may be much more aggressive and unafraid than another kind. Its language will show that aggressiveness by being louder or bolder or more insistent. If you study the life of the animal closely, you will sense the difference and be able to interpret it correctly. By listening carefully you can detect differences in tone. The animal's action will probably explain what those tones mean. For example, while it runs away, the noise it makes obviously means that it is afraid. Try to put yourself inside the skin of the animal so you can understand what emotions it is expressing.

Since the languages of most animals are instinctive, it is a good idea for us to know just what "instinctive" means. An instinctive language is an unlearned language. Thus, a puppy that is raised completely away from other dogs will bark, growl, whine, wag its tail and wriggle

with delight without being taught to do any of these things. However, a dog that has experience with other dogs learns how to use all these signals better and more expressively than the dog who is raised alone.

Some animal language is not instinctive. A few highly intelligent animals, such as a wolf or a crow, learn a good deal of their language by copying adults, as human children do. Thus the young crow instinctively knows the common "Caw!" cry of the crow, but it learns from its parents and from other adults all sorts of inflections of this cry that have different shades of meaning. So part of crow language is learned as well as instinctive.

Animals communicate with calls, songs, and colors (including colors that can be changed voluntarily, as when an antelope flashes its white rump patch in the sunlight by moving the hairs). Animals also express themselves in movements which are sometimes so small as to be noticed only by very sharp and watchful human eyes, but which have rich meanings between animals of the same kind or species. Animals also use smells to leave and send signals. It is necessary to keep all these means of communication in mind as you watch any animal.

Notice how the kind of weather and the time of day, night or year affect animals and their languages. Squirrels and chipmunks stop chattering and hole up for a nap during bad weather, for example. A cold day may cause a bear to go to sleep or into hibernation, but it will make a marten or weasel more active than ever. Some birds, such as the poorwills and owls, are heard mainly at night and are active then. Others, such as hummingbirds and sparrows, are active only during daylight.

Observe the great difference in all animals between the times when they are mating and other times. Bull elk and buck deer become short-tempered and dangerous in the fall when they seek mates. California woodpeckers fill the days of spring with constant noise as they seek mates, but become very quiet later on.

Territory is very important to some animals, and it influences their use of language. In the spring many birds stake out special territories by using their songs to warn other birds of the same kind to stay away. Many lizards also claim territory, and use different ways to drive rivals away.

Remember that each living place (or habitat) has an influence on the animals that live there. You will hear birds scream on the seacoast, where they must be heard above the roar of the waves. You will see animals of the Great Plains depending much more on eyesight and distant signals than do animals of the deep woods, which rely more on their ears and their noses for awareness of the approach of friends or enemies. Animals living under water depend much on observing each other's movements, especially as they flash in the sunlight. If you wish to understand animal language, watch for all these things.

CHAPTER 2

Domestic Animals

This chapter concentrates on the languages of a few of the familiar domestic animals. The languages of such animals are strongly influenced by man, and in turn they often use the learned parts of their languages to influence man.

DOGS

When I open the door of my house in the morning and go outside to start the chores, our two dogs, Billy and Tad, rush up barking to greet me. It is a glad, happy bark, not the sharper bark of alarm and warning given when a stranger comes. If I pet one, the other jealously shoves in so his head will come under my hand too. Then, as I walk toward the barn, both run in front of me, turning their heads to look back and making a peculiar deep growling whine that expresses several emotions, including joy, pride and an invitation to play. It would be impossible for me to put all of it into words.

There are so many differences among dogs as to character, and their characters are influenced so much by the various kinds of masters they have, that not even a large book devoted to the subject could cover all these variations. Here we can give only some of the basic ideas of dog language.

In my own experiences with dogs I have progressed from lack of fear through fear and back to confidence again. As a nine-year-old boy I was bitten severely by a police dog, and for years after that I was afraid of dogs. They all sensed this and gave me a bad time, approaching with hair raised and growls in their throats. Later, by an effort of will, I managed to conquer this fear and learned to express from my heart a feeling of love and interest in all dogs. The change in dogs who approach me has been truly remarkable. Now it takes only a minute or two of quiet talk and slow movements to make good friends with most dogs.

Dogs are extraordinarily sensitive to the feelings of the human beings around them, and may detect evil in a person whom the master considers perfectly all right. A dog will often drop its tail and look miserable when told to be friendly with someone he instinctively dislikes. Dogs also are likely to absorb the characters of their masters. The dog of a man who is a bully may also be a bully. Dogs who are kept chained and severely disciplined tend to be very vicious towards strangers.

To understand dogs we need to know something of their ancestry. The chief ancestors of most dogs were probably closely related to the present-day jackals of central Asia. They were domesticated somewhere around twenty thousand years ago. Later, as men began to advance into the far northern lands, the domain of the wolf, the jackal strain was here and there crossed with that of the wolf.

The attitudes toward man of the jackal strain and the wolf strain are quite different. The jackal is a slavish follower; the wolf can become an independent compan-

ion and friend. The jackal dog is inclined to be friendly to all men. The wolf dog is much more aloof, and usually chooses one man as its pack leader. In jackal dogs the loyalty to the pack is not very strong. In wolf dogs it is very strong, and the wolf dog transfers to its human master that former loyalty to the pack leader. The jackal-dog attitude toward the master is more that of a puppy towards its mother: it remains childishly dependent on the human master, even after it is adult.

The great majority of domesticated dogs have mainly jackal blood. A few — such as the Alsatian, the chow, the Husky, and the German shepherd — have chiefly wolf blood. As you study dogs and the way they communicate, keep your eyes open and notice the difference between the two main types. You will, for one thing, notice that some are friendly toward all humans and so recognize no particular master. These are jackal dogs. At the other extreme is the very independent pet who also obeys no one master, yet is usually friendly toward one person though hostile towards nearly all others. The dog who makes the best pet is somewhere between these two extremes, loyal to one person above all others and protecting his master's family, but friendly also towards other people if properly approached.

A dog has much better smelling and hearing faculties than we have, but its sight is usually not as keen as ours. This is why sometimes your own dog may come rushing toward you, barking and growling, if the wind is blowing from it to you. It sees you as a kind of blur and does not recognize you as master until close enough to smell you or to hear your voice.

Watch two strange dogs approaching each other, and

notice the various ways they use to communicate. If one is a puppy, it turns over on its back, and makes water, meanwhile frantically waving its tail. The older and larger dog approaches and sniffs over the puppy, also wagging its tail. A male dog would no more think of attacking a puppy than of attacking a female.

If the two dogs are both males of nearly equal size, and strangers, they approach more slowly, with legs stiff, hair on back raised, rumbling growls in their throats. They come to a halt close together with nose to tail and sniff at each other's tails. This is as strict a rule as anything at a diplomats' top-hatted reception. Meanwhile both dogs have their tails absolutely erect as a sign of their courage. If either tail should begin to drop, it would be a sure sign

that this dog was becoming afraid. He would probably soon turn and run at full speed, with the other dog snapping at his heels. If, however, the tails stay up, then there is usually a prolonged period of growling and slow circling, each trying to outbluff the other. Then sometimes one dog begins slowly to wag his tail. This is a sign he wants to call a truce and play, instead of fight, but that he will fight if necessary. The second dog often wags his tail too, after a while, and then the two run off for a romp.

If a real fight is going to start, the first sign is the drawing back of the lips into a horrible grimace. The second sign is usually that each dog suddenly scratches his feet vigorously on the ground. After this they close with loud growls and yells, and the fight begins. In the fight each dog tries his best to meet with his own teeth the teeth of the other dog. Thus the teeth act like shields or like fencing swords. Really skillful fighters will counter teeth with teeth for some time before going in closer. Except with certain breeds — such as the bull terrier who is trained to kill — these fights rarely end in death. When one dog feels he is being licked, he may suddenly expose his neck to his enemy. You would think this would mean the end, that he would be seized by the throat and choked to death, but this rarely happens. The other dog growls horribly and stands within an inch of the unprotected throat, making no attempt to grab. This is because the first dog has begged for mercy. The chivalrous rule among dogs, as among wolves or jackals, is that a plea for quarter must be observed.

However, the dog who has turned his throat dares not move for some time and he stands still with head lifted.

Finally the victor decides he must mark this place of his victory and goes over to water on a nearby post or tree. The instant his back is turned, the other dog runs; and, from that point on, the losing dog always lowers his tail when he meets the winner and either runs or tries to be friendly.

The situation is sometimes changed if it is a much younger dog who is licked in a fight. The young dog gets older and stronger while the older dog gets older and weaker. Finally the younger tries a fight once again, and this time wins.

The attitude of the male dog toward the female is very different. He is usually as friendly as can be, wagging his tail and trying to get her to play. She, however, may resist his advances by sudden growls and snappings at his face. At such signs of disfavor, he draws back with a most pained look, as if to say, "Oh, come now, let's be friends!" Gradually she may thaw toward him and become more friendly, leaping up and pawing at him with her front feet. Sometimes, though, she remains grumpy so long that she discourages him completely.

Both male and female dogs leave scent signals wherever they water. When the female feels the mating urge, she goes on a trip around the countryside, leaving her smell signs where male dogs will find them. Then she may confidently await their coming to find her. The male dog leaves his scent signal not so much for the female as to warn other males by the strong odor that he is a big, fierce dog and that this is his territory.

Most dogs do not mate for life as the wolves do. The male mates with many different females, as the jackal does. So there is little family life and it is rare that dog

packs have the close cooperation found among wolves. The Huskies of the far north are an exception because of their strong wolf blood.

The sounds that dogs make convey different meanings. The whine of the puppy is a demand for food. The yelp is a sign of fear or of pain. The bark of a dog has a feeling of interest and excitement and warning. The annoying, shrill bark of a small dog has in it something of fear. The deep, almost savage bark of the big, powerful dog sends forth a threat. When dogs bark as they play the sound is full of joy, but the sharp, insistent bark of dog to master usually means it is begging for something or wants some action, such as "Get the ball and let's play!"

The dog is even more expressive in sending signals with his body. It wiggles all over with joy when it knows the master is going to take it for a romp. It may seize its master's pant-leg to hurry him up. It may whirl around and around with excitement, meanwhile barking furiously. Some dogs will bring a ball or a stick when they want it thrown. A common signal from a dog who wants to get in or out of a house is going to the door and scratching at it. If this is forbidden, it will learn to stand there and whine, or just stand there with big eyes looking sorrowfully at the door.

Our two dogs spend hours playing with each other. If Tad wants to start a game, he nips Billy in the rear and runs away, with Billy in close pursuit. But if Billy isn't interested, he lowers his head between his paws and growls. This means "Go away! I want to rest." Sometimes the play gets a little too rough and one of the dogs growls a protest. The other crouches, with his front body low and his tail end up in the air, barking loudly, as if to

say: "Aw, come on! Don't be mad just because you got nipped a little too hard!"

A younger dog often watches an older with great care. If the older dog barks, the younger barks too. If the older dog growls, so does the younger. You can see that, by this copying, the younger dog is trying to act like an adult. Young dogs who have been brought up completely isolated from older dogs show both more nervousness and more stupidity when faced with an emergency, because they have not learned how to meet it.

A good trainer teaches a dog many new words, not only those for it to expect from the master, but those for the dog to use in reply. A hound is taught to come for help and to retrieve. It learns to stay with one kind of game instead of being distracted by others. Some of the signals sent back by a hunting dog to its master are instinctive, however, as when it barks with great excitement and eagerness beneath a tree in which a wild animal is treed. And many bird dogs point with their noses instinctively when they sight a game bird.

The Eskimo dogs or Huskies are much like wolves in their reactions and their methods of communication. They form packs of five to ten individuals, with each pack usually attached to one master and one sled. Each pack has its own special territory, which it defends ferociously, and its own leader that the other dogs in the pack obey because of its superior strength and wisdom. Young Huskies, who have not yet learned the territories, are always being chased off or nipped by their elders.

The numerous ways in which dogs talk to men or to other dogs — the bark of anticipation, the whine of pain seeking help, the howl of loneliness when the beloved

master is gone, the hankering whine of a male trying to woo a female — can only be touched on in this book, and many must be left out because of lack of space. Study your own dog or the dogs of your neighborhood and observe how their feelings are expressed in their voices and in their movements. You will soon be able to understand the language of dogs, particularly if you feel

kinship with their emotions. With love comes understanding.

CATS

Just as among dogs and men, among cats too some are stupid and some intelligent. Geniuses are no doubt capable of some really remarkable things. However, here we are only going to talk about regular run-of-the-mill cats and how they express themselves.

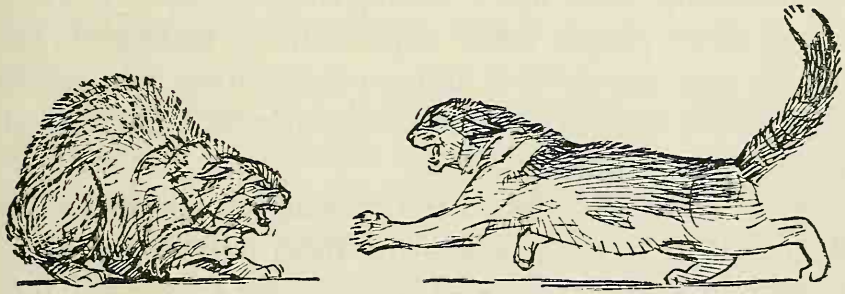
Cats have no pack language like dogs, and little interest in obeying the commands of men — though there are exceptions. A cat is primarily interested in good food, a comfortable place to sleep, and other cats — particularly those of the opposite sex. It uses different tones of a miaow to obtain what it needs; it uses a deep, humming purr to tell others when it is completely happy. It uses a guttural growl to express displeasure or anger, and, if a male, goes into the most awful variety of caterwauling, moaning, growling and screaming when it wants to tell another male cat it doesn't like him.

A cat is a solitary hunter. When it hunts a mouse, the wriggling tail tip, the slightly swaying shoulders, the tense crouch and the glaring eyes tell all other cats and carnivores to leave that particular mouse alone. If robbed of the mouse, it lets out an outraged squall. The cat's habit of playing with a mouse it has captured but not killed is cruel to the mouse, but it is very useful for a mother cat in teaching her kittens to hunt. The clumsy way a kitten misses its first pounce shows how much it has to learn.

The cat has never become as completely tamed as the dog. Many dogs will let a child pummel them without

protest, but a cat soon reaches the end of its patience and turns with a little miaow or growl of anger and uses its sharp claws and sharp teeth to get away. This miaow, given with a rising inflection of annoyance, is a milder warning than the deep growl and hissing of a thoroughly enraged cat.

The cat's final stand against injustice and real danger is made with every hair standing on end and the tail sticking straight up in the air. The ears are laid back against the head and the lips drawn high to expose the white canines. This menacing figure, combined with a ferocious hissing and snarling or moaning, is often sufficient to keep a small dog or even a medium-size one from attacking, unless it is thoroughly reckless or has had no previous experience with those flying claws and sharp teeth.



Two male cats preparing for a fight do not act this way, however. The primary objective is for one to bluff the other into running. The hair is lifted, though not standing on end, and the tails lash back and forth in spasmodic jerks, telling the watcher of the emotional state within. If the tail lashing increases in speed, we know one cat is about to attack. There are also the laid-back ears and the

facial snarl of rage, but the main bluff is carried on by sound, particularly a deep moaning, interspersed with spitting, fearsome wails and savage growls.

If neither cat runs, one will finally grow impatient, lash his tail furiously, and suddenly rush his enemy, his belly low to the ground. The reason for the low rush is that, as soon as the battle is joined, each tries to swing his body under the other and bring his hind feet and claws into action, driving terrifically against the belly of the other cat. Clinching, rolling, tearing, squalling and screaming, they tumble over and over, first one on top and then the other, but the one who does the most belly-scratching wins. At last one cat will give a scream of pain, tear himself loose, and run away — often to die, because belly wounds are usually fatal.

The male cat's song to the female is another form of caterwauling, more like a wailing tremolo, and a piercing sound most people don't appreciate at midnight! The female may answer in a higher-pitched tone, but usually she is quiet, approaching her prospective husband through the shadows to look him over.

Most of us have heard the mewing of kittens calling their mother to come and bring them milk. That sound turns into an agonized wail if she is too long gone. But, after the milk is in their tummies, they curl up in great luxury and purr themselves quickly to sleep. Both the young and the adults give a squall for help if they are caught by an enemy. This turns into an ear-piercing scream if they are hurt.

They have different ways of talking to men, and there are many cat personalities, largely developed by the attitudes and habits of the people they live with. Cats

learn quickly how to get the best from humans. They learn whom they can bully and whom they must wheedle or flatter to get what they want.

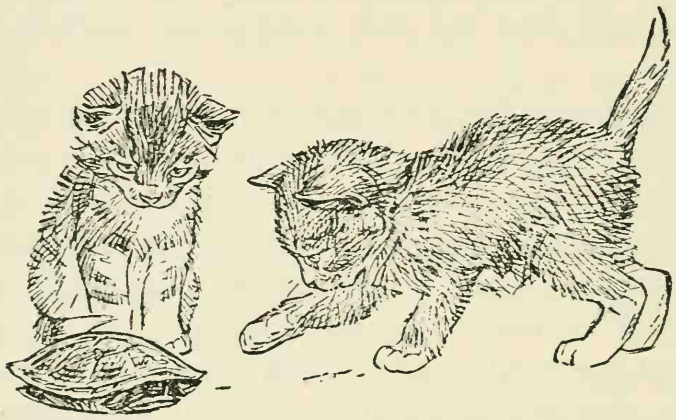
Some spoiled darlings have chairs they consider their own, and anyone who disturbs them gets first an annoyed "Miaow!" and then a blow with sharp claws. A cat of the other extreme, who has been treated roughly by its master, miaows with fear and runs away when anybody comes near it.

One common way a cat communicates with humans is to rub against a leg or to pull gently at pants or skirt with sharp claws. This is usually a request for food or attention, though sometimes it is a method of getting people to play. One cat I knew would rub and purr loudly against the legs of its master until he finally gave in and started off to get it a bowl of milk. Then, knowing the treat was coming, this pet would dash around his friend's feet, purring and rubbing against him in a paroxysm of delight.

These animals show they enjoy petting by lifting their heads and necks towards the petting hand and arching their backs. At such a time a truly blissful look may come into a cat's eyes. However, I have seen them change from this apparent pleasure in less than a second, suddenly turning and biting or scratching the hand that petted them. Possibly some part of the body was "rubbed the wrong way"; or they may have simply become bored with being petted too long. But this does emphasize how unpredictable cats sometimes are.

Kittens, and to a lesser extent adult cats, are great explorers, and are often very curious about new objects. A cat or kitten expresses curiosity by a widening of the

eyes, an alert cocking of the ears, and a stealthy approach, almost as if it were hunting. When it finds a new object it sniffs it all over and proceeds to test it with both teeth and claws, though very tentatively at first by reaching out and touching the new thing timidly with the tip of a paw.



Some cats scratch at a door to be let out, but most usually stand in front of it and mew forlornly. One funny cat character who was anxious to get outside went first to the front door and discovered it was snowing, then to the back door, and finally to each window, hoping the snow would be gone!

Cats are often tremendous admirers of themselves, and some will sit in front of a mirror for hours primping and cleaning themselves. A cat will, in particular, clean itself with paw and tongue after a dangerous experience or when it has fought with another cat. This is not so much to make itself look good after being mussed up, as it is an attempt to soothe the nerves by doing something natural and instinctive.

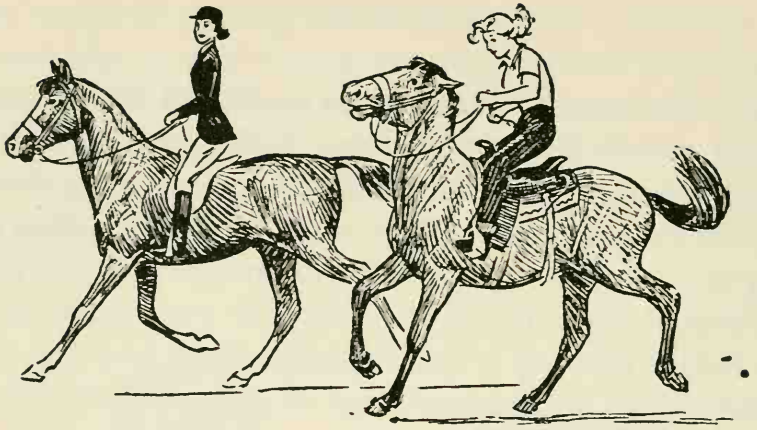
HORSES

In some ways horses are not as intelligent as either dogs or cats, but in their expressions of affection and love toward a human master they may outdo even dogs. A true love between a master and a horse brings the horse running at a whistled or shouted call, not just for the apple or piece of sugar that it may know is waiting for it, but also for the pure joy of comradeship. More than any other animal such a horse loves to run its soft nose over a hand, arm and neck.

My wife, who was raised on a cattle ranch in Colorado, has tamed and ridden numerous horses. I have seen her ride her favorite horse, Laddie, bareback at full speed with nothing but a single piece of string as a bridle. She signaled him to turn left or right with a pressure of her knees and a slight pull on the string. In such cases the feeling of love and cooperation passes from the hands and the legs into the horse's body, and back again like an electric current, and horse and rider seem to understand each other perfectly.

When I rode Laddie there was no such recognition. My control over him depended on my strength with the bridle. When he wanted to run, there was no stopping him unless I exerted all my strength to pull back on his head. He showed his resentment for this unwanted signal by throwing his head from side to side and crawfishing sideways in full gallop so that I was hard put to it to stay in the saddle. When I brought him to an abrupt halt he would sometimes rear to show his indignation. Clearly horses sense the difference between riders.

A big white horse, Eagle, that I owned in Panama,



could be captured only by being fed stalks of sugar cane, of which he was very fond. Once haltered, he showed his resentment by trying to bite me, pulling back his ears and baring his big yellow teeth. This gradually changed as I lost my early fear of him and became more firm. A horse always senses when the rider is a little afraid of it, and sometimes seems to test a stranger by biting or bucking.

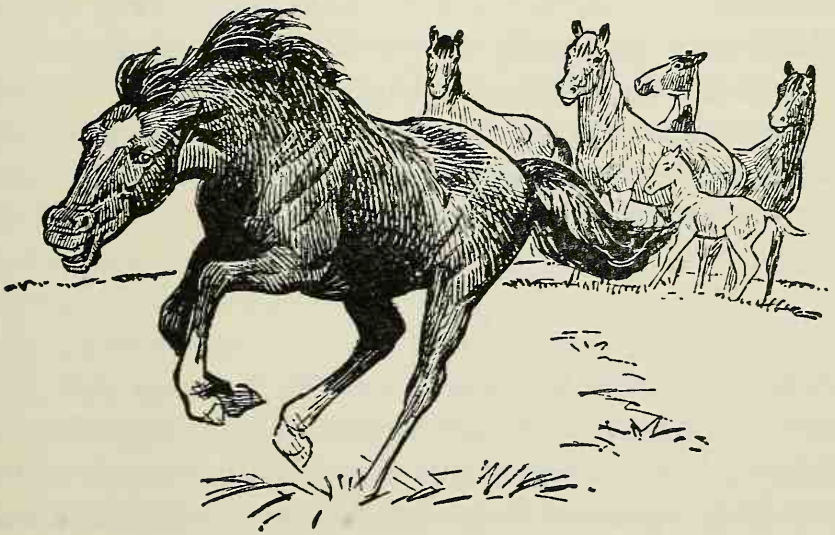
Horses meeting for the first time, or after an absence, sniff each other's noses in a kind of test greeting. If they are friends, they are soon either nuzzling each other in a friendly way or grazing together. But if they are former enemies or one horse doesn't like the smell of the other, back go the ears in the symbol of anger and one or both may jump at the other, biting and kicking. At the same time they snort and whinny with anger.

Stallions attempt to gather harems of mares. They may round up a mare who tries to run away, but, strangely, they do not lead the herd. This is always done by the wisest and most experienced mare. She signals to the herd to wait by stamping her foot and staring ahead. When she

is sure it is safe to go on, she starts forward again, the herd following her. If the leader turns and runs, the herd turns with her as one horse and rushes away, for each has been watching her carefully.

If a strange stallion or gelding approaches the herd, however, it is the stallion who takes command. With many nips at their buttocks, he drives the mares away in a tight bunch. Then he gallops toward the stranger, snorting and whinnying with anger. His ears are laid back, his lips are drawn up to show his teeth. If the stranger does not run, he is attacked furiously with slashing teeth and hoofs.

Young colts talk to each other with the language of movement. It is all glorious play, a running to and fro at top speed. Up goes the tail of a colt in the signal that he wants to run. Up go the tails of all the other colts that see him, and away the bunch goes, recklessly, sometimes whirling around and kicking at each other in sheer exuberance of spirits. But if danger nears, the whicker of



the colt calls his mother and she comes running with an anxious whinny. She hovers over him, her body guarding him, and the feel and touch of her is a message of comfort to him.

You can sometimes talk to a horse by breathing in its nostrils and speaking to it calmly in the highest voice you can manage. Some wild or skittish horses have been remarkably tamed in this way. Always approach very slowly, and without the slightest fear. Stand still when near, and now let the horse approach you, if possible. Be very patient — and finally bend over so your nose comes close to its nose, and you breathe right into the nostrils. Do not attempt to pet the horse until you are sure it is friendly, and then move your arms very slowly.

The trembling of a horse's body shows you that it is afraid. Soothe it with a gentle voice and petting. A horse that is tired droops its head nearly to the ground. A horse that is thirsty blows flecks of foam from its lips and whinnies and snorts when it smells water, then rushes ahead at full gallop, if you let it. When it smells or hears a distant horse, it whinnies loudly; this is both a greeting and a desire to see the other, a desire that is especially strong if the horse has not seen another for some time. Horses love the company of their kind.

CATTLE

Anybody who has been chased by a savage bull, and lived to tell about it, knows the warning signals — or should! For instance, I was chased once through eight-foot jungle grass in Panama by a big brindled bull, and

got over a fence just in time. I heard, first, a pawing on the ground, then a loud snort, and last the crash of a big body plunging through the grass. I have been told by those who should know that in the last resort you should throw your body on the ground and lie perfectly still. The bull may nose you a bit but otherwise leave you alone. It is the moving object that he is interested in goring.

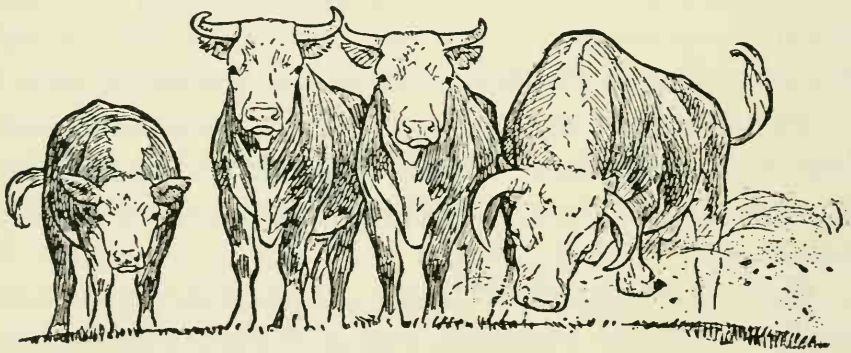
Most bulls are comparatively peaceful if you do not tease them, especially range bulls (like the Herefords) who have plenty of cows to interest them and lots of room. But when you see a bull encircled by the fence of a small field and all alone, look out!

In the fights I have seen between range bulls, the first signal given to each other of hostile intentions is the throwing of dust. The front feet are used to churn up the ground and throw as big a cloud of dust as possible over their backs. This is sometimes done also when they are fighting off flies, but two bulls facing each other usually means war!

They soon begin to snort and bellow their rage, working themselves up to make a charge. They get nearer and finally one bull gives a bigger bellow and rushes at the other. The two meet with a smacking noise of horns and skulls, shake their heads to clear away the shock, back off a way and charge again. If one bull can gore the other in the side or force him back by superior strength, usually the other bull turns and runs and the fight is won.

Cattle are very curious. When one of a herd sights something strange, it turns and faces towards the object or person with an open-mouth expression, the ears spread wide and the big nostrils flaring as they sniff. In a few

seconds every member of the herd has caught the signal from the first animal and all turn and look the same way. If one cow or steer becomes alarmed, it throws its tail suddenly straight into the air (a warning signal) and turns and gallops clumsily away. Usually the rest of the herd does the same. However, I have known them suddenly to come rushing back from another direction, overcome by their curiosity to see what I am or perhaps hoping I have food or salt for them. Where cattle are half-wild and used only to men on horseback, they may actually charge a man on foot, snorting and bellowing to work themselves up into a rage.



The cow comes into periods every month or so when she is ready to mate with a bull. Our cow, Star, begins to bawl loudly on such a day and may keep it up off and on for as long as two or three days. She is also much more restless and more impatient about being milked. The bull either smells or hears the cow, or both, at such times and begins to bellow an answer as he comes. Some cows are quiet and give only the mating scent at this time.

Star has had four calves since she has been with us and

so we have had good opportunities to watch the communication between cow and calf. When the calf is very young, Star is much more anxious about it. She bellows a warning when she sees our dogs and the calf comes trembling close to her. If the dogs come too near, she bellows again and rushes at them, swinging her horns. When I move the calf away from her, she rushes me too, but stops about a foot short of me and moos, as if to say: "You be careful; don't you hurt my baby — or I'll have to horn even you!" The calf stretches his neck, opens wide his mouth, and lets out a loud "Maaa!" when he wants her for protection or is hungry. Her tongue, as she licks the calf, speaks a language of endearment, and she gives a soft moaning sound, which I call her mother-love song.

Cows have different ways of communicating with their masters. When the udders are too full of milk and hurting, the cow gives a low bellow of pain that means she wants to be milked soon. When bothered badly by flies, she constantly throws her head back around her shoulders, throwing spittle at the flies or trying to swish them off with a mouthful of hay. This means she is in need of spraying or powdering to get rid of these pests. When she is determined to get to her food in a hurry and wants to show her independence of her master, she shakes her head violently and rushes full tilt for the feed bin. When she wants water, she stands by the watering trough and bellows.

SHEEP

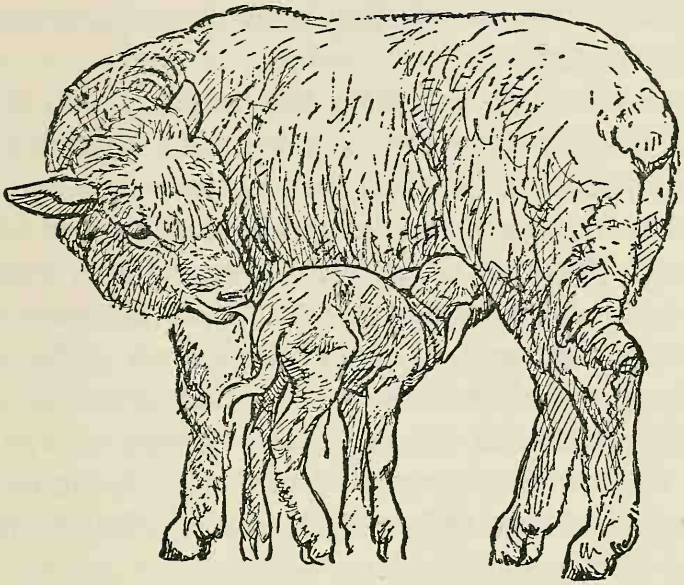
Sheep are supposed to be very stupid, but we have raised sheep for four years and my wife did for many

years before that, and we find much that is of interest about them. They are considerably smarter than one would think about sneaking in through the gate and getting into our flower and vegetable gardens. One old ewe hides near the gate sometimes and sneaks in when it is opened to let in a car. If the rest are near, they come right along with her.

As with most animals, the ewe's first job when the lamb is born is to lick it all over thoroughly. While doing this she makes a peculiar little *muh!* note, repeated over and over. There is a good deal of anxiety and love in this sound, as if the mother were saying: "Are you alive? Are you all right? Are you *really* alive?" Once the mother has finished the licking job, she has completely absorbed the special smell of her own young one and henceforth will never mistake her lamb for another. If twins are born, sometimes one twin is not licked in this manner; the mother rejects it and butts it away just as if it were a real stranger. Such a forlorn little orphan, who constantly wails in a treble voice for a mother who never answers, has to be raised by bottle, and we call it a "bummer." In a day or two it decides that I am its mother and follows me everywhere!

When the normal new lamb is hungry it bleats very softly for food. It butts around blindly with its head until, by accident, it comes in contact with one of its mother's nipples. Once it begins to suck, a blissful look comes over its face, and it closes its eyes. The sign of high happiness is its tail, which wiggles at a high rate of speed. Meanwhile the ewe, giving her repeated mother's cry, turns around and gently licks the rear end of her newborn. By this little drama of mother and baby the two become

united, each signifying its love and need for the other. The act is repeated in every mammal family at the time of each new birth.



If you watch the tail of a sheep, you can tell a good deal about its emotions. When my sheep gather around me excited over the prospect of grain, their tails are wagging vigorously. Then the tails sway slowly as the sheep contentedly feed. On the other hand, when a ewe wants to tell a ram she doesn't want him to bother her, she also excitedly wags her tail before making a quick run away from him. Should the tail be held down close to the body, it would mean the sheep is frightened or disturbed.

Two rams preparing to fight do so with much less fanfare than two bulls. They usually simply back away from each other with heads lowered, then rush together with a crashing impact of skull against skull. This butting of heads may last only a few minutes or go on for

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an hour or more, depending on whether the two are nearly equal in strength or not. Sometimes one or both may have their skulls seriously injured by the blows. More often, one ram, feeling he is the weaker, suddenly turns and runs.

When the lamb is young, the mother sheep is much braver towards dogs and coyotes than later, and may actually lower her head to rush at them and butt them. First, her feet are often stamped in warning and her ears laid back. At other times of the year, when a killer dog gets among sheep, it finds them easy prey, for they all run, without any attempt to defend themselves. After one of our sheep was killed by such a dog, the rest of the flock were nervous for days, and seemed to run from every shadow that moved. When running in fear, the tail is tucked low and a loud "Baa-a!" full of fear, is given.

The baa of a sheep can be varied to express various meanings. The lamb calling its mother for milk or when it is lost has a high-pitched tone. An eager and loud sound comes from all the sheep when they think I am bringing them food. The ram has a kind of guttural "uh-uh-uh-uh" sound when he is wooing a ewe, and places his head close to her side. Then there is just the conversational baa, in ordinary tones, of members of the flock keeping in touch with each other while feeding.

RABBITS

Most people think of rabbits as being all alike, but we have found many very different characters among the hundreds we have raised. Our New Zealand white rab-

bit, Alice, always taught her babies to be very clean and never to put their droppings or water into the food and water dishes; Alice simply nipped their little behinds when they did something naughty, and they soon learned to behave. But many other mothers were quite slovenly.

You know when a mother rabbit is soon to have young ones because she begins to pull out fur from her chest, neck and body and place bunches of it in the nesting box. She is extremely absorbed by and fussy about this job, as if the fate of the world hinged on her doing it just right! The babies are born a day or two afterward and are kept covered by the soft fur if the nights are cold, or left exposed if it is hot. They are naked and blind, but are capable of making tiny mewing noises when they are hungry or disturbed.

If a dog comes near, the mother hops about anxiously and stamps her feet; she would kick him if he came too close. But against gopher snakes she reacts by crouching in paralyzed fear in one corner of her cage and allowing the snake to eat her young ones without protest — you have to rescue them.

Young rabbits, when they get a little older, squeal with great vigor if they are picked up. No doubt this cry is used to bring the mother to help them when there is real danger. The adults also squeal loudly when hurt or chased by a dog, and this loud squeal might be of use in temporarily upsetting an enemy so the rabbit could kick its way free and run.

The grown female rabbits usually have a great dislike for each other because of the instinctive desire of each female to control a certain feeding territory and not allow any other female near. When put together, they first spar

vigorously like boxers with their front feet, then try to secure a bite and curve the body over, kicking powerfully with the hind feet. Blows from these feet could actually disembowel another rabbit. The ears are laid back flat on the head at the start of these fights and often the two mumble angrily at each other. Males fight in a similar way, but seem to be less interested in fighting than females.

When a male and female are put together, the male immediately begins to nuzzle the female and nibble at her with his mouth, which is his way of wooing her. If the female is not interested, she hops rapidly about, mumbles and whines in an angry fashion and violently shakes her head. She may even turn on him and bite or box, but he does not fight back. This angry mumbling whine is also used by one female to show her jealousy of another female who is with the male. Such a female expresses great annoyance by jumping about and throwing her head and shoulders from side to side.

The noses of rabbits are highly expressive of their curiosity and interest in each other and in other animals and things.

When a rabbit sees or sniffs something strange, it may squat back on its hind legs or even stand up to full height and wriggle its nose vigorously, trying to catch the scent of the strange thing. If it tastes something that it doesn't like, it sniffs and snorts violently, rubbing its nose quickly with its forefeet.

When it is curious its ears cock forward and spread wide to catch the slightest sound. A rabbit expresses its health and well-being by sitting up and grooming itself with its front forepaws, first running the paw through the

mouth to wet it and then combing its fur on the sides and head. A healthy rabbit likes to be clean, and a sure sign that a rabbit is not feeling well is when it begins to allow itself to get dirty.

CHICKENS

Chickens are among the most familiar of all domestic birds. My wife and I have raised various kinds for the last six years and have had many fine friends among them. There was Turkmom, the hen who raised many baby turkeys; Carol, who could sing most beautifully; and Caesar, as gentle and friendly a rooster as ever lived. Though chickens vary in their personalities, they are still subject to certain rigid social rules that govern their relations with one another and how they communicate.

Baby chicks have a constant, shrill "Peep, peep, peep!" when they are hungry or cold. This changes into a slower, gentler and more satisfied peeping when they become warm and fed. As they get full and drowsy under the warmth of the brooder light or their mother's body, they each tuck a head under a wing and go to sleep. They are born with the instinct to peck, and at first they peck at everything and pick it up, but soon they discover that certain things are good to eat, usually the yellow color of grain, and after that they peck at anything yellow.

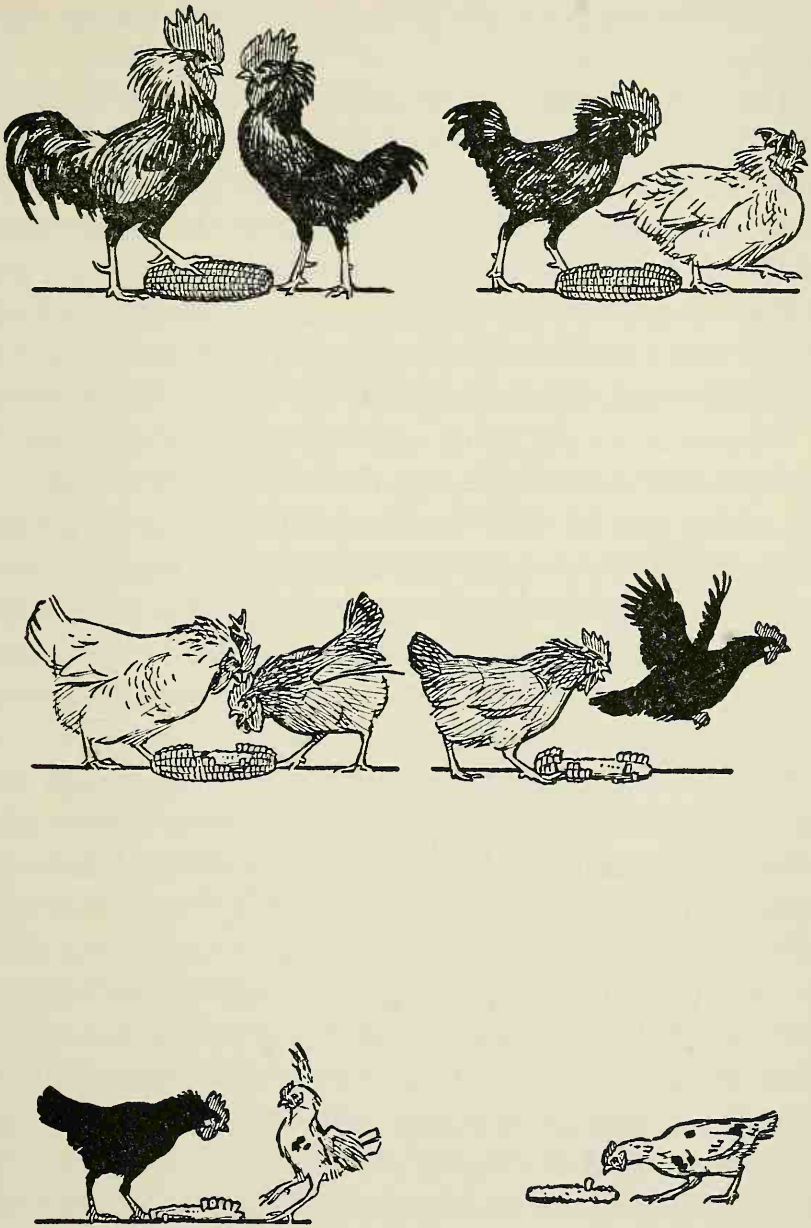
Before the chicks are many days old, little fights start between them. These are hardly more than play at first, but gradually the chicks learn who is stronger and, what is sometimes more important, who has the most courage. Gradually the flock begins forming what is called the

"peck order." The bravest and strongest chicken is at the top of this order. When he pecks any of the other chickens they run away from him. The second bravest and strongest chicken can peck all the other chickens except Number One. So it goes, until finally one poor lonely little chicken can be pecked by everybody else, but has not one it can peck!

When one rooster meets another rooster before the peck order has been established, they both spread their neck feathers into a ruff and stand as high and stiff as they can on their legs. This is the challenge to fight, and, if neither backs down, they fly at each other, pecking with bills and striking with the spurs on their feet. If nearly even, the fight may go on for a while and even end in a draw. Otherwise the weaker rooster suddenly lowers his tail feathers in a sign of defeat, ducks his head and runs for his life. After that he just runs whenever the other rooster approaches.

Hens appear to be able to spot something nice to eat and rush for it long before the roosters catch on. Dumb males! Every chicken in sight almost immediately sees the running hen and runs too, to see what it is she is after. Thus the movement acts as a signal.

There are several calls given by chickens, hens having more of them than roosters because of raising the chicks. The loud cackling of a hen who has laid an egg expresses deep pride, and is usually answered by a rooster who makes a loud cry of joy and announcement, as if he had done the work as much as she had! This is always a big moment in the chicken yard. Another call is the loud squawking cry of alarm when a hawk or other large bird is sighted. This sends most of the chickens scurrying for



Higher to Lower Peck Orders

shelter. The cry is usually given by an old hen, wiser than the rest.

The crow of the rooster in the morning, or at other times of the day is simply an expression of his strength and maleness, the rooster who is king of the chicken yard giving the deepest and longest crow. We had one young rooster who crowed so badly that the other rooster, our beloved Caesar, would give him a disgusted look, sit back on his heels, puff out his chest, open wide his beak and give a thorough demonstration of the correct way to crow!

Whenever we put fresh straw in our chicken nests, a half-dozen or so hens jump up on the roosts to oversee the job, every one of them crooning a little song of delight over getting a clean nest. This crooning is a signal of pure happiness. A somewhat similar trilling is heard at night when the chickens settle themselves down — warm and comfortable on the roosts, feeling protected, among friends, and ready for sleep.

Suppose one chicken is feeding in the feed trough and another chicken of lower peck order comes up too near the same place to get a bite. The first chicken feels insulted, ruffles up her feathers in warning, and turns and makes a sharp peck at the intruder. The answer is a shrill squawk of outrage and hurt, and the lesser chicken stalks angrily away, also ruffling all her feathers. A somewhat different message is given by a rooster who has found some overlooked grain or a nice luscious worm. His idea, instead of keeping all the food to himself, is to call all the hens over so he can show them what a fine fellow he is. So he immediately starts up a rapid "Cuck-cuck-cuctckt!" — meanwhile vigorously scratching the ground. At his call all the nearby hens come running; he

proudly watches them eat, strutting up and down to show off his plumage.

The hen with baby chicks has a somewhat similar call when she finds feed for her young ones. "Cut-cut-cut-cut!" she calls rapidly, and all the babies come running up to where she is vigorously scratching the ground and pecking. About half the time she drops the picked-up food from her mouth so the babies can get the idea and eat it. Another, softer cry from the mother, a kind of soothing "Ptt-ptt-ptt," brings the little ones under her widespread wings when a rain is coming.

Our Airedale, Jill, came around a corner one day and ran unexpectedly into a mother hen and her chicks. Instantly the hen's feathers puffed out in all directions, making her look twice her normal size, and, with a loud war cry, or squawk, she leaped right at Jill's face, striking with both beak and claws. Jill let out a yelp of fear, whirled and ran, with the triumphant mother hen practically riding her back and digging in with every toenail! Meanwhile the chicks had obeyed the ancient call to scatter and run in every direction to hide in the grass and bushes. When the mother dropped off her fleeing enemy's back, she came back and began a series of soft clucks that gradually pulled her brood together again.

The rooster who is wooing a hen does so not only with his loud crows and his scratching of the ground, but often spreads the feathers of one wing so they scrape the ground, and circles around her with a sidling, scuffling movement of his feet. If she doesn't like him, she runs away; but if she does, she crouches to the ground. Some hens show their love for a rooster by gently pecking at his bill.

TURKEYS

We have raised hundreds of turkeys and find them in some ways more delightful than chickens, though often dumber. Young turkeys, unlike young chickens, have to be taught both to pick up food and to drink water, as they seem to be utterly helpless when just out of the eggs. However, when put in with baby chicks, they soon copy their techniques.

On the other hand turkeys do something in the early dawn that seems to me quite wonderful. They all stand facing the east and appear to watch in silent ecstasy as the sun starts to rise over the hills. It is a moving thing to see!

One thing I like about a young turkey is its joy at being alive. When we let them out of their night pen into the wide and golden freedom of the turkey yard, they spread their wings and flap them gloriously, and then rush about flapping and jumping high, at the same time uttering a high-pitched "Peep peep peep!" that expresses unlimited delight.

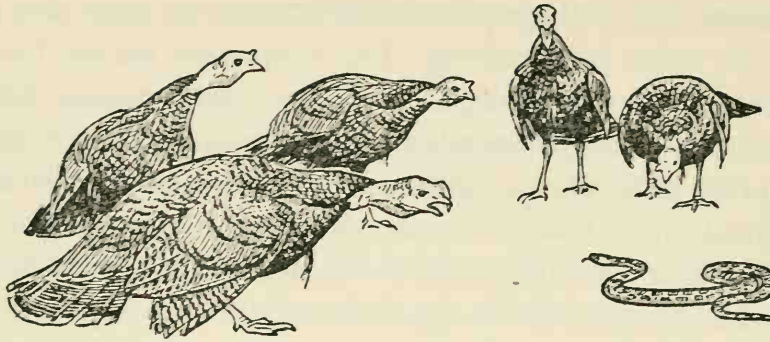
The peck order is not nearly so rigid among turkeys as it is among chickens. If one turkey "gets a mad on," it seems to be able to rout even a bigger turkey, provided the other doesn't get just as mad. A fight between two turkeys is quite different from a fight between chickens. The first sign of trouble coming is when one or more turkeys start to spread their tail feathers and wings, stretch out their necks and then begin to call names. One turkey sidles up to another turkey and gives a sharp peck. Immediately the turkey war cry increases in volume!

This cry, a high-pitched "Krooot-krut-krooo!" is repeated rapidly over and over as long as the fight lasts and

expresses both bad temper and an attempt on each side to bluff the other into quitting. The expression on the faces of both turkeys in the fight is strictly nasty, almost ludicrously so. They are so intent on doing each other bodily harm that nothing else matters. Back and forth they strike and peck until one gets a deathlike grip on the other's wattle. Then the caught one twists its neck in all kinds of snakelike contortions trying to break free.

Turkey fights usually stop when one of the turkeys breaks loose and makes a run for it. However, as the mating season approaches in the fall, battles become more and more serious. If blood is drawn, other turkeys may join in to attack the bloody one, and before long this weaker bird is pecked and trampled to death by the mob. Sometimes a turkey can save itself by stretching its neck out along the ground. This is a signal of submission, and usually ends the fight.

Tame turkeys have smaller brains than wild turkeys and are not nearly so well equipped to protect themselves from danger. However, they do give each other warning. At night I have heard their "Prrrrt-prrrt-prrrrt!" exclamation of alarm, and crept out to see what was wrong. Twice, because of this warning, I have caught raccoons robbing the chickenhouse. The turkeys on their high roosts in the turkey yard had seen a strange, dark animal sneaking by the fence and had given the old cry of alarm to the flock. In the daytime, I have heard this same cry announcing a snake in their yard. When I arrived, I would invariably find them all about the snake in a half-circle, their necks craned toward it, uttering their warning, and gradually working up their courage to attack and kill it.



When the mating season draws near, the big tom turkeys begin to strut and spread their feathers before the hens. Their wattles get very red; they tuck their chins proudly back into their throats and move forward in jerks, at each jerk making a noise deep in their throats that reminds me of a car's motor starting. The females watch them admiringly, and, when a hen wishes to show she is deeply interested in a particular tom she walks up and crouches on the ground in front of him, making a low, gentle "Qt-qt-qt" noise.

When danger approaches from the sky in the form of a hawk, turkeys crane their necks and look upward. If there are baby turkeys about, a hen suddenly gives a loud "Prrrrrt!" cry and all the babies run for the shelter of the bushes, squatting down and making themselves as inconspicuous as possible. At such times they hold perfectly still without a sound and are very difficult to find.

Turkeys we raised under the brooder came to regard my wife and me as their mamas and would follow us around, giving the high "cheep" of hunger until we fed and watered them.

The gobble of the full-grown tom is an expression of pride and is probably also a way of showing off to the fe-

male, but it may also be an answer to a challenge. When I shout at a flock of turkeys, the toms gobble back at me almost as one bird, stretching out their necks and shaking their bright red wattles. Possibly this loud noise from a flock has some value in frightening away a potential enemy.

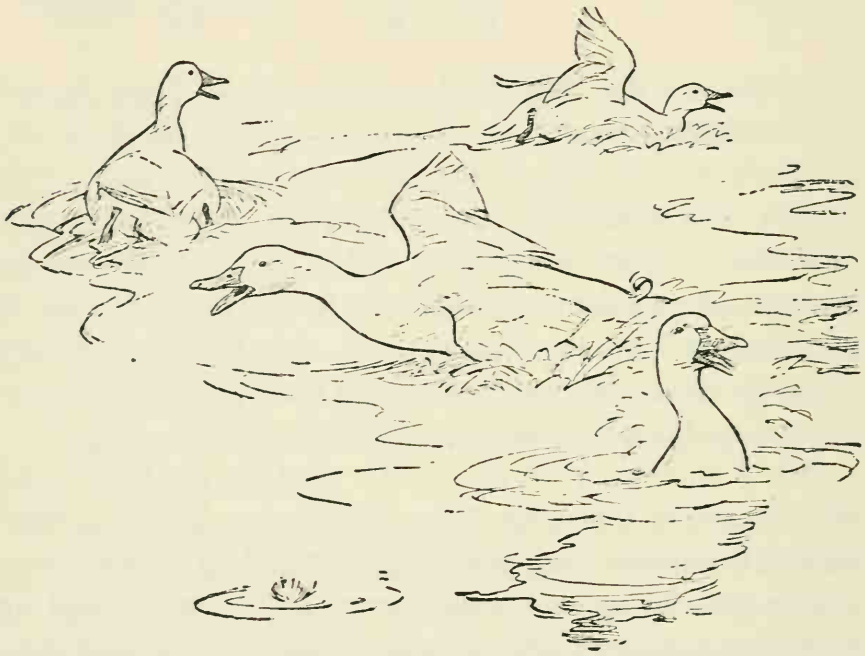
DUCKS

Ducks are the clowns of our barnyard. They do the most amazing things! For instance, one female duck followed the rooster all over the yard, curving her neck coyly at him, and constantly quacking until the poor rooster didn't know what to do! The quack of the duck can go through several shades of meaning simply by its change in tone. When I try to catch a duck, she quacks so loudly and with such great fear in the tone that it sounds remarkably like a hysterical woman screaming "Help, help!"

When we have cleaned out the pool for the ducks and they approach the fresh water, they act as if they cannot believe their eyes, they are so delighted. Luxuriously they stretch their necks and heads down into the water and sip it up with a look of utter rapture. Then one of them runs in a crazy circle quacking with low-toned joy, and suddenly wheels back and dives into the water. Up and down under the water it goes and then to the surface, beating it with wings and giving a half yell, half quack of triumph that is a call to the other ducks to come join the fun.

Ducks seem to like to talk to each other socially much more than chickens do, for their constant quack-quack of inquiry and friendliness is heard repeatedly, especially when they can find some shallow water in which to run

their bills. This bill-running through water — in and out, opening and shutting at high speed, and probably finding tiny things to eat — is in itself a kind of conversation. The two ducks run their bills through the water almost side by side and often touch bill to bill as if kissing, all the time seeming to be enjoying themselves greatly.



In the mating season, the male duck follows the female into the water and talks to her by constantly preening himself, showing his curled tail feathers, and ducking his head up and down with a peculiar motion. Both quack to each other, often at high speed, and soon she begins to duck her head up and down too. When you see the two rubbing their long necks together, you know the male has made a conquest.

CANARIES AND PARAKEETS

Canaries have long been the most popular of indoor bird pets, but their place is being challenged these days by parakeets or "budgies." The latter are the more intelligent of the two birds, and also have a more extensive language.

We kept canaries for fifteen years and loved the clear beautiful singing of the genuine German roller canary. The song, of course, is a pure expression of joy at being alive, combined, in the mating season, with the outpouring longing of the male for his mate and a challenge to all other males to stay away from his territory. The most intelligent of our birds was named Peppy, and he loved to fight with a human finger, attacking furiously with his bill and cheeping a savage war cry.

The male and female canary express their joy in one another by rubbing bills together and also running each other's feathers through their beaks. Each takes turns feeding regurgitated food to the young ones, who signal when they are hungry with wide-open bills and loud cheeps.

The ordinary "Peep?Peep?" of a canary, given with a rising note of inquiry, is usually just a social call from one canary to another, but sometimes it means he wants somebody to pay attention to him. Our birds enjoyed greatly being talked to, and would cheep back a constant reply, as if to say: "Tell me more!" When we let them free from their cages, they would fly round and round the room and then often light on our shoulders with a cheep of triumph at their own daring.

Parakeets, with their greater intelligence, are up to

many more tricks. Their light twittering cry can be varied in tone to give different emotional meanings, including what seems to me very close to laughter when they have done something naughty and think they are getting away with it. They can be trained to do many clever tricks, such as taking food out of the lips of their master, or walking upside down along a thin stick. The bill of a parakeet acts as a third hand in climbing about. The bird expresses emotions of anger or nervousness by snapping its beak, and hunger by opening it wide and calling plaintively.

The parakeet male and female love to preen each other with their bills, going carefully over each feather and crooning softly all the time in a kind of love song. They also pass regurgitated food back and forth, and this seems to be something in the way of a kiss, for they greatly enjoy it. But they can get into loud squabbles very easily if one does something the other doesn't like. Probably a whole book could be written about the language of parakeets and parrots.

CHAPTER 3

The Meat Eaters

Meat-eating animals occasionally eat each other. Thus the hunter becomes the hunted, and the actions and language of the animal who is hunted greatly change in tone and meaning. The large weasel-like animal, the fisher, may chase down and eat the smaller member of the weasel family, the marten. When the marten finds itself chased by its large cousin it reacts with the same typical fear actions and cries that drive the squirrel to terror-stricken flight before the marten.

Carnivores (the meat eaters) are generally of more fierce temperament than the herbivores (the plant eaters); the structure and muscles of their faces are adapted for more vivid showing of rage and threat. The wildcat, crouching over a mouse it has just caught, pulls back its lips ferociously from its long, sharp canine teeth in a snarl of warning. Its tail lashes furiously back and forth, clearly saying: "Stay away, this is my food!"

THE WEASEL FAMILY

Members of this family, with the exception of the skunks, are all strictly meat eaters, and consequently their whole lives are based on the chase of prey. With the ex-

ception of the badger and the wolverine, their long slim bodies are particularly well-adapted for following animals into holes.

We may divide the weasels into three general groups:

(1) The solitary, instinctive chasers and killers, which includes most of the true weasels;
(2) The intelligent and semisocial otters;
(3) The amiable, omnivorous and lazy skunks.

(1) Most weasels, minks, badgers, martens, fishers and wolverines are solitary creatures who come together only for brief periods at the mating season. For this reason they have little need for communication and so their language is rather primitive.

I once watched two long-tailed weasels in the Sierras hunting for mice in a pile of logs. They may have been mates, but there was no cooperation in their hunting. Each was silently intent on its own business, and the chief language they gave was one of movement. A twitching of the nose and the head swung in an arc from side to side told me they were trying to catch the scent of a mouse. A lowering of the head and a sudden flash of movement as the weasel dived down between some logs told me it had caught the scent and was on a hot trail. A shrill squeak from a mouse told of terror under the logs, but the weasel was silent.

One weasel leaped up onto a log with a mouse in its mouth and proceeded to tear its prey to bloody shreds and gulp them down. When the other weasel passed near by, the first one arched its back, opened its mouth, drew back its lips and made an almost soundless hiss. This was suf-

ficient warning to stay away, for the other did not come near, but continued its own hunting.

The almost snakelike hiss of warning seems to be common to most of the weasel tribe, including the otter. They also have a harsh snarl, deeper in tone in the larger animals, and a blood-chilling scream that is fortunately rarely given. The snarl is given in bluffing and also in actual combat, and it is always a sign of mean temper or rage. The scream is a sign the weasel is in mortal agony, deadly fear, or insurmountable rage as when its food is stolen from it.

Young weasels, martens and their like have a cry that is a kind of cross between a mew and a whine with which they call their mothers when hungry or lost. Sharp snarls from the mother warn them to be silent or to hide. I once heard young weasels playing in a pile of brush. They were chirping softly to each other almost like birds, moving with such speed in an apparent game of tag that only flashes of their bodies were seen.

True weasels seem to move and act mainly by instinct, showing little of the curiosity that goes with intelligence and sensitivity. The marten, the fisher, and the mink,

however, show some curiosity. I have heard of a mink carefully exploring a dam; and a marten once tried to investigate me, until it discovered I was alive!

Young weasels sometimes give a curious, crowing note when their play is the most fun. Very young weasels squeak hungrily for food. The mother short-tailed weasel has been heard to call her young with a kind of grumbling "Coo-oo" that seems to mean "Come on, children, we must be going home now." A shrill snarl or scream of warning sends them tumbling down a hole into hiding, or even makes them seize their mother's fur tightly in their teeth so she can carry them away at full speed.

The mother and, more rarely, the father will set examples for the young, which the young copy at first crudely and then with more and more ability as they grow older. I have seen a mother weasel in captivity drag a wounded mouse over near her young and by pretending to pounce urge them to catch it. Soon they sprang upon it and tore it to pieces with delighted and shrill snarls.

In the mating season, which happens mainly in late fall (though sometimes in the early spring), the attraction between the male and female is equaled by the hatred between two males. If two males meet and one is smaller, the larger male puffs up his body, sticks his hair straight out, arches his back, lifts his tail high, and advances menacingly to the attack, while giving a deep and savage growl of warning. The smaller male crouches low, hissing and spitting his rage, uncertainty and fear. Usually, at the last possible moment, he turns and runs. If the two males are nearly equal in strength, both act as the first male described above, but they advance more slowly toward each other, sometimes slowly circling. One may bluff out the

other, or both may have such deep respect for each other's fighting ability that a truce will be declared and they will back slowly away and go their separate trails. Often, however, there is a fight to the death.

A female, when she is ready for mating, may attract the male with low clucking sounds. She may run from him a little way, but her running is full of invitation in every twist of her sinuous body, and she often looks back. When he gets too close, she may snarl at him and even bite, but her snarl and bite are only half-serious.

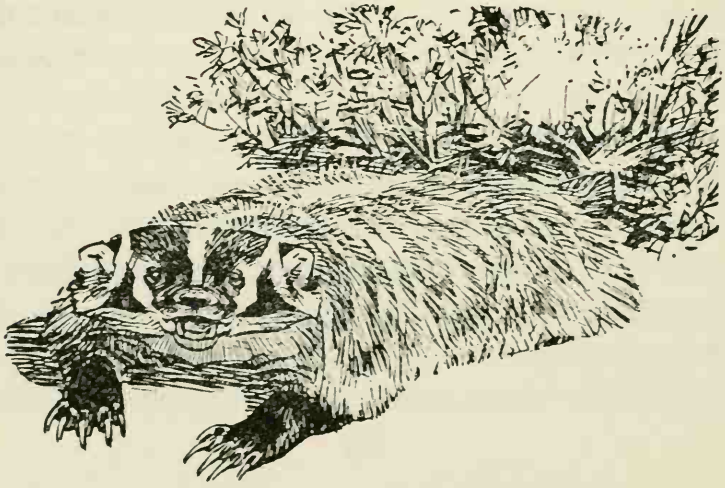
To the male one of the main attractions of the female lies in the scents she leaves from her scent glands along the trails. These glands are in the rear of the animal and give out a smell that is quite vile to men, and usually obnoxious to most other animals, but which seems to be delightful to weasels. The male also leaves his scent here and there in the woods, partly to attract the female and partly to warn away other males. Weasels can tell from these scent deposits much about an animal. A male tells us by his attitude of anger or of eager interest whether the scent was left by a rival male or a friendly female.

The mink, because it leads so much of its life in the water, has somewhat different reactions from other weasels. It loves to explore streams and ponds, and the snarling screech the mother gives when there is danger may cause the young to dive into a dark pool as soon as hide in a hole in the ground. When hurt or excited, the mink may give a remarkable shrill, twittering squeak, almost birdlike. The loud sniffing of one mink is a signal to another that it has found something interesting to investigate. When one mink finds the dung or droppings of another mink, it

stops to study them carefully, especially if it is in a new neighborhood. It may be able to tell what food supplies are available.

The badger is probably the most solitary of all the weasel tribe with the exception of the wolverine. Since it hunts its food mainly by digging ground squirrels and other rodents out of the ground, much of its life is spent under the ground. The immensely powerful and heavily clawed front legs are specially meant for high-powered digging. I once watched a badger dig itself out of sight in the Nevada desert in less than a minute! When he has found a ground squirrel- or rathole with a live inhabitant, he tells you so by the snuffling noise he makes as he sticks his nose deep into the hole.

My wife and I followed a badger for several hundred yards one day in the Great Plains of Colorado. This one made no attempt to dig to escape us, but scuttled along with its flat body low to the ground. When we got too close, it would back into a bush with its head facing us and snarl and hiss ferociously. Its hair stood on end and it



seemed to spread and flatten its body even more than usual in a clear warning not to come too close. This trick of retreating backward into a bush comes plainly from a need for protection against dogs and coyotes, who are thus forced to face the formidable teeth and jaws. As we followed it, occasionally we would catch a strong and bad-smelling whiff from its rear-end glands, clearly let out to discourage our attack.

In the early part of the year the male badger begins to look for a mate. He rubs his tail glands on bushes and trees and leaves a smell to lure the female and at the same time warn away other males. A grunting noise from badgers at this time of year probably is something in the nature of a mating call, the male and female hailing each other. The female bites and snarls at first when approached, but finally the two are blissfully rubbing noses and sides together.

(2) Otters, both those of the sea and those of inland rivers and lakes, are among the most humanlike of all animals. The affectionate family life of the mother, father and children, and the social gathering of relatives to play and talk is very much like that of men. Otters scream when wounded, hurt or frightened in a very human tone, and their liquid, dark eyes are deeply expressive of pain and even pleading. Otters have even been known to kiss, and to fondle one another with many sounds of endearment.

The river otter, which is the only one I will consider in detail, is more solitary than the sea otter, which gathers together in herds — or pods, as they are called. Each male river otter has a special range that he guards from

intruders. This range may cover a length of fifty miles or more of river and take over two weeks for the otter to cover thoroughly. To this range he lures his mate and in it the two raise their young. Often the male and female may mate for life, and they are very kind and hard-working parents, taking great pride in their children, whom they watch over fondly.

Many movements of the otter have meaning to its own kind, and to us if we watch closely. A quickly lifted and snakelike twisted movement of the head is given when it is watching out for danger. It may turn its head slowly, a brief swing at a time, sniffing deeply of the air, when it is trying to catch the scent of an enemy or another otter. The otter springing up out of the water of a river with a fat trout in its teeth certainly is a picture of the self-satisfied hunter. It shakes the water off its dark, sleek fur with a gesture of triumph. While an otter has not been known to slap the water with its tail, like a beaver, surely the sudden loud splash of the father otter as he hits the water in a swift dive is much louder than the usual sound of his dive for fish, and this splash is clearly a warning to wife and children to get out of the neighborhood in a hurry. I have heard the warning twice on the Eel River in California.

Also on the Eel I once watched an otter swimming swiftly through shallow water, trying to escape from me. The body twisted and turned among the rocks like a dark eel. When it reached a deep pool, it surfaced briefly, snorted loudly by blowing water from its nose, and dived into the dark depths under overhanging rocks. The snort was a warning to other otters that a deadly danger was near!

Both young and old river otters love to play endlessly on slick clay slides down the steep banks of rivers. I have watched them hit the slide and shoot down it, to end with a satisfying splash in the pool below, with every bit of the delighted expression of small boys sliding down a good snow hill on sleds. While sliding they talk together with low, birdlike chirps that have different meanings according to the inflection, such as "Hurry up — it's my turn next!" or "Boy, is this fun!"

A kind of satisfied grunt is given by the otter when it has eaten its fill of good food, or is lying in the sun and having a good sun bath. Another very different sound

is its shrill half-whistle, half-squeal — very short and sharp and often with a peculiar quality of anger or hate. This is usually given when the otter feels its rights are being infringed upon, such as when another animal or otter steals its food. If the otter feels it can beat the thief, it backs up this squealing whistle with a more savage growl or snarl. A sniffing whicker or low snort is given by an otter when inquiring of a companion about food or danger.

Occasionally, the cry of the otter rises into a hair-raising scream — extremely shrill, and one of the loudest and farthest-reaching sounds of the wilderness. This is its supreme cry of rage, hate or defiance.

When the male river otter finds a friendly female, the two play and romp together like children, chirruping gently. The touch of nose to nose and side to side also has its message. Both mates may have first sent out signals by the smell stations they leave along a riverbank. These are simply piles of dung and urine mixed with mud, but each with its distinctive individual smell that tells another otter much about the individual who left it.

The love of otter pairs is so deep that often, if one or other of the pair is killed, the living one becomes very despondent, chirrups sadly for its lost mate for hours on end, seeking and seeking for the one who is gone. He (or she) may even refuse to eat and actually appear to die of a broken heart.

River otters generally mate in late winter or early spring and the young are born about two months later in April or May. The father is generally away during the early part of their life, but usually soon joins the family and the two parents begin to teach the young all their wis-

dom of the wild. Young otters cannot swim without being urged by their parents, who chirrup encouragingly from the water. If they still stubbornly refuse to come in, the mother may take them on her back, swim into deep water and then slowly sink from under them.

Later the parents teach them how to sneak up on a fish, turn over stones for insects, and how to dig through the mud for eels. The mother urges them to these tasks with a peculiar mixed whine and growl that seems to say: "Try again and do better, children! You can, you know!"

At the first sign of danger the mother gives a loud chirruping and clucking sound, almost like a mother hen, and leads her young to safety, while the father, by his snorting and splashing, may try to lure away the enemy in the opposite direction. If a stranger otter comes near, there may be a good deal of hissing in warning, and, unless this scares it away, a fight.

Unlike most of the weasel folk, otters rarely are driven by the savage killing instinct of the smaller weasels, which may kill far more creatures than they can eat. The otter kills only when hungry and then rarely more than it can eat. If sad or lonely, it may not eat for many hours or even days. But when happy with its kind or even alone, it is far more playful than most weasels — tumbling, rolling, playing tag and follow-the-leader. A lone otter has even been observed playing with a smooth stone by tossing it into the air and catching it in its teeth.

Sea otters play and fight, and hunt for mussels and other sea food among the vast kelp beds of the Pacific Ocean — where the mothers rock their children to sleep in the natural cradle of the waves. When men are sighted, loud cries of warning cause the otters to hide among the

kelp; for men, by ruthless hunting, have almost wiped these animals from the face of the sea.

(3) Long ago, in the morning of the world, one member of the weasel family learned that it could throw a bad smell from its rear end and so help defend itself by gas warfare. This discovery and its subsequent development and improvement in future generations produced a revolutionary new character in the animal world, the skunk. The skunk has no speed either to catch animals or to run from them. It cannot follow them into a small hole in the way a weasel can. So, for food, the skunk has to eat almost anything it runs into that it can overpower, including insects and worms and some plants, and it must use careful stalking or ambushing to catch such fast creatures as mice. But for defense against enemies, it is well prepared, so well prepared that it usually has no fear of attack and is consequently quite lazy and friendly in nature.

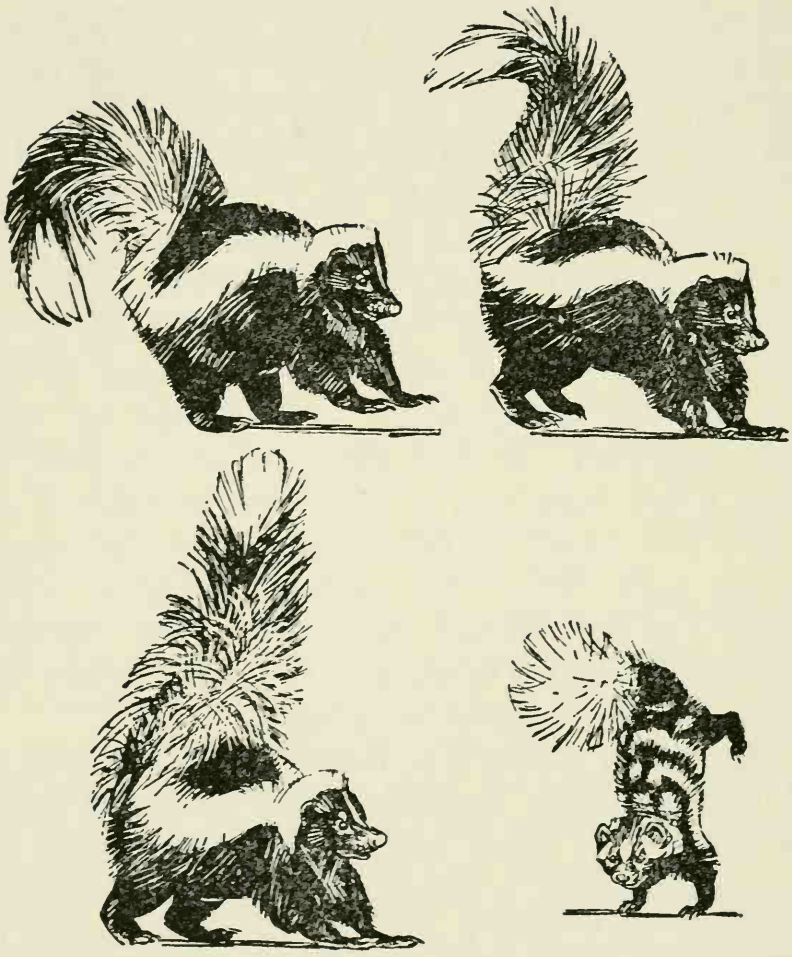
Because of this ability to shoot powerful jets of dangerous fluid and gas a distance of eight to twelve feet, from a pair of glands in its rear end, the skunk seems to say when you meet it: "I'm minding my own business and you just mind yours. I don't want a fight, but I am not afraid of you. You keep away from me and nothing will happen, but if you get too close you'll wish you hadn't!"

I recently followed a striped skunk for a distance of more than a mile. At no time did it travel faster than a man could go at a good fast walk, even though my two dogs as well as myself and my four-year-old daughter Tamara were constantly pressing near to watch. Occasionally it would stop and stamp its feet, which is a solid skunk warning that means: "You are getting too close!"

Once, when I came to within ten feet of where this skunk was ambling up a dry creek bed, it shot out two yellowish jets of liquid in a fine spray for a distance of about four feet behind. The powerful smell struck my nose like a battering ram and I drew back very hastily!

Skunks vary greatly in character. I have met skunks who were very nervous and ready to throw their scent with little warning, and others who were quite hard to stir up and obviously so friendly that they would throw gas only under the most severe provocation. The usual skunk goes through three warning signals before spraying. First it turns toward you and stamps its feet, looking at you intently out of its small black eyes. The second warning is to raise and spread the tail — all but the tip, which hangs downward. The third warning usually is given just before it lets loose with a salvo from its guns; at this point it first throws the tail tip up sharply, and spreads out the hairs. When that happens, it means "Jump, *quick!*" The little spotted skunk of the West sometimes varies these warnings by standing on the front paws only, like an acrobat balancing on his hands.

The smell of skunks is no doubt also used to give signals to other skunks, especially during the mating time in late winter. The skunk smell, coming on a damp day through the woods, is genuinely pleasant to a real outdoorsman, for it gives a sense of the strangeness of the wild. Each such scent is conveying to other skunks who smell it a knowledge of the one who made the smell, whether it is a he or she, and whether it is in a mating mood or not. Unmated females often let off little explosions of musk along the trails, to tell possible boy friends they are ready for company.



Warning Signals

When male skunks approach each other to fight over a female they give a low snarl, the more scared snarling the louder. They may stamp feet at each other, all a part of the bluff to scare the other away. If a fight actually starts and one skunk feels he is losing, he is apt to squeal very loud and long and then turn and run away. The snarl and stamping express anger and warning. The squeal is the hate-full cry of one who realizes he is losing.

Baby skunks are usually born in the spring and are generally looked after by the mother alone, though occasionally the father has been reported to help. The mother and children have several communicating sounds and movements. If the mother senses danger, she may turn toward it with her nose out and her whole body tense. Instantly all the little skunks turn and tense. If she wants her babies to stop their play, she may give a low churring, scolding cry that brings them running to her. A birdlike twittering may be heard when all is well with the world.

Some friends of mine once surprised a mother skunk and her seven little ones in a brushy park. Sensing danger, the mother started off through the brush as fast as she could go, with the seven half-grown skunks close behind her and running almost in unison, nose-tip to tail-tip. She chittered to her young with a sound so soft as to be just barely heard and turned her head quickly from side to side, watching them to see that each kept its correct place in line. It was almost as if she were saying: "Children! Children! Stay as close as you can to me; move fast, but make no sound. There is danger!"

At one time in the hills of central California I heard the mating song of the striped skunk, though I did not recognize it at the time. It started as an uncanny whistle

in the night — something like the cooing of a dove, only higher; then slowly it became deeper and more guttural, as if going way back in the throat; and here it wavered for a while, going both up and down the scale, at last ending in a long-drawn and soft purr like a cat's. I think now that this was the male's call. The sound had in it a quality of deep longing that must surely have touched the heart of any female skunk listening to it.

Skunks make very good pets, especially when they have been de-scented; they behave very much like cats. One pet skunk I knew always gave a little whine when it wanted to be taken up in the arms of its master and fondled. When it wanted to draw attention to its need for food, or to be let out of the house, it would scold with a high, chittering note and sometimes stamp its feet.

Angry skunks have been heard to give a single, low, hoarse bark. At mating time in the hills much squealing is heard, meaning often a female is resisting the too ardent advances of a male, or that two males are squaring off to fight.

The little spotted skunks of the West are more humorous and friendly characters than their big striped brothers. I have helped tame wild ones simply by offering food until they came whining to beg it from my hands. They were quick and nervous and constantly exploring everything with wriggling noses.

THE CAT FAMILY

In North America north of Mexico we have three common native members of the cat family among wild animals: the mountain lion, the Canada lynx, and the wild-

cat or bobcat. Along the Southern borders of the United States, some rarer wild cat creatures are found, including the big spotted jaguar, the lesser spotted and streaked ocelot, and the small brown or gray cat, with slender neck and head, called the jaguarondi. But my story here will be about the three common cat creatures.

There are certain basic instincts and ways of communication that are common to all our native cats. All of them hunt by the stalking or waiting methods, rather than by the chasing method of dogs and wolves. Both stalking and waiting methods of hunting end by a pounce, or a series of swift bounds, upon the prey. When stalking, the body of the cat seems to concentrate into the smallest possible space. Every bit of shelter is taken advantage of, and the direction of the animal being stalked can be told by the point of the cat's nose and eyes. The lashing or bobbing of its tail tells us that it is warning all other hunters to leave this prey alone!

When the cat freezes into silent immobility, we know that it is afraid the animal being stalked may see the hunter. It moves forward only when it is sure the victim is looking the other way. We realize it is about to make the final jump when it stops, crouches low, and begins to bring the powerful muscles of hip and shoulder into coiled bundles of energy, ready to hurl their owner forward like a suddenly released spring. The tail moves quickly back and forth, the body sways or trembles a little, and then, as a bloodcurdling growl or scream rises from its throat, the big cat shoots forward like an arrow from its bow!

The waiting method of hunting is somewhat different. The cat finds a branch of a tree or ledge of rock that overhangs a game trail, or, if this one is a bobcat hunting mice, simply crouches in the grass near the mousehole. The whole emphasis now is on patience. It waits in complete silence, sometimes for hour on hour.

If you should be fortunate enough to discover a cat hunting by this method, you would probably notice it only because of the jerking motion of the tail. I once saw the tip of a jaguar's tail moving in such a fashion, in the dense jungles of Panama, but it took over ten minutes of patient watching before I could detect the body of the big cat, so utterly quiet was it and so well did its golden tawny and dark spotted hide merge with the light and shadow of the forest.

You could tell when such a cat thought that its wait was nearly over and that its prey was soon coming. The hindquarters would lift ever so slowly, and the muscles would begin to bunch along the thighs. The ears would be directed sharply toward the sound of an animal approach-

ing, and the body would begin to sway very slightly. This swaying motion apparently helps trigger the muscles for a quick getaway. Suddenly a growl or scream would sound out, and in the same instant the big cat would seem to disappear, so quickly would it leap forward to the kill.

The wildcat of North America is about the size of three or four house cats and has a voice at least three times the size of a tame cat's. The night I heard and watched two wildcats fighting in the dark woods of the Napa Mountains in California I felt as if my ears were going to split. The yowls, screams, growls, moans and caterwaulings, as the tide of battle swung first one way and then the other, would have lifted the hair of an Apache.

These loud voices that vividly tell us of the emotional state of the cat, including pain, rage, and fear, are useful to the animal in bluffing its enemy and also in paralyzing the will to escape of a smaller animal when it is pounced on. But the wildcat can also be extremely silent when it wants to be. I once watched one in the hills near Orinda, California, trying to find a bird's nest to rob. It crept through the brush more silently than a ghost, keeping to the dark side of every bush, and crouching so low to the ground it seemed to worm forward rather than walk. At the slightest noise, it stood perfectly still for moments at a time. Its whole attitude showed me it was trying to avoid discovery at all costs. I wondered why — until I saw what happened.

The wildcat found a thrasher's nest in a high bush and was reaching up through the branches to grab the tiny birds inside when the parents discovered the cat. Instantly they let out cries of rage and darted fearlessly at

the intruder. At their cry, other birds — jays, titmice, wren-tits, towhees and so forth — came rushing to the rescue. The wildcat was surrounded and mobbed by birds and their cries on every side. With tail pressed close to its body (a sign of depressed spirits) and ears pressed down on its head (a sign of irritation and anger), it slunk away, still silently, through the brush, its black ear tufts twitching. So defeated did it seem that a pair of jays were fooled into diving vaingloriously to within a foot of its nose, screaming names at it. This was a mistake — for the wildcat, a magnificent male in glorious spring colors of tawny orange and black, suddenly lashed its short tail from side to side (a sign of imminent action), and leaped straight up in the air with claws spread like fishhooks. One of the unfortunate jays was brought down in a cloud of blue feathers and quickly killed.

Wildcats mate in the northern sections of our country in late February or early March. Then the woods may be filled with their "singing" and challenges, though these sounds are little heard in areas where they have been severely hunted. Two males of equal size approach each other with utmost caution — their lips writhing up to turn their faces into masks of fury; their squalls, moans and growls threatening immediate death. Sometimes one is bluffed into sudden leaping away, its tail at the down-signal of defeat. Other times they wail, caterwaul and growl for many minutes without action and then leave with mutual respect for each other's bluff. But often they close in desperate battle.

A wildcat sometimes leaves its droppings on top of an anthill, and this may be a signal, to other wildcats, concerning its sex and attitude. Another sign to other

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wildcats is a scratch on the bark of a small tree as far up as some particular cat can reach. This mark indicates the size of the animal that made it, and may help in scaring away other wildcats from its territory or in attracting a female.

Young wildcats are born in the late spring and act in all ways like tame kittens. Though very appealing when young, they soon turn into the almost untamable wildcat that spits and growls at all who come near it. The mother gives a sharp snarl to warn them when danger approaches and sends them scurrying into their den in the rocks or in a hollow tree.

The large cousin of the wildcat in the far north, the lynx, is very similar to the wildcat in habits and attitudes, though it is an animal of the deep pine woods (as opposed to the wildcat's home in the brush, broadleaf woodlands or abandoned farmlands). But it is much better adapted for running about on the winter snow because of its large, flat feet.

At the time of mating, in the latter half of October, there is considerable caterwauling, yelling and growling by the males, especially on moonlit nights, sounding like many battles in progress; but actually there is far more noise, yelling and bluffing than actual fighting. A proof of this is shown by the numerous unharmed lynx skins brought in by trappers. Probably the larger animal simply bluffs the smaller one away by his loud noises and by puffing out his body.

One to six young lynx are born in litters in the spring. The kittens are noted for their fierce and penetrating miaow when hungry. By midsummer the young are

weaned by their mother and by fall they are large enough to move about on their own, though bands of four, five or six are often seen wandering together at that time, sometimes hunting together. When such a lynx band is hunting the snowshoe rabbit, members may spread and actually drive the rabbits as men do, calling signals to one another with sharp whistling noises. They also watch each other and, when one lynx is seen in pursuit of a rabbit, the others circle about to spring upon it as it runs past in its fright.

It is possible that the tall black ear tufts of the lynx, as well as its nervously twitching black-tipped tail, help in signaling. The ears are laid back when the lynx is about to spring and at the same time the tail waves furiously. The ears cocked forward tell another lynx to wait and watch and not disturb things until the hunted animal is located.

A sort of yowling mating song has been reported from lynx land, a weird cry that is halfway between the long "Hal-loo-oo!" of a woodsman and the wailing cry of a loon. It starts with a long, deep "Me-ow-oo-oo!" followed by several cries of a shorter "Me-ow!", then rises in pitch and volume into a continuous "Row-row-row!" wail, which gradually turns into a series of hair-lifting, nerve-racking screeches.

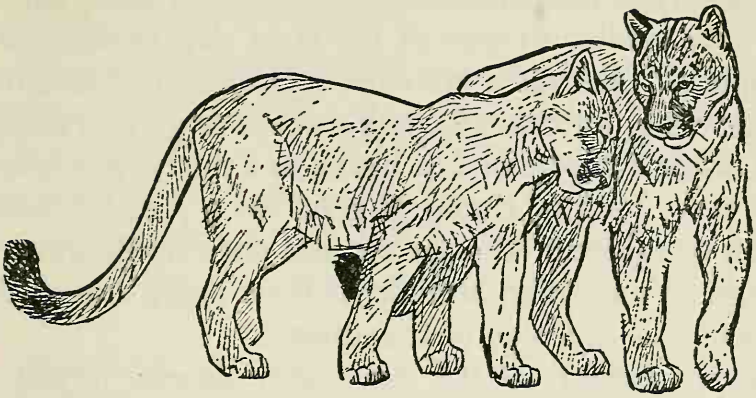
Silent, almost invisible, utterly wary of man, the mountain lion or cougar sneaks among the rocks and brush of a hillside, merging its long brown body with every bit of cover. It is looking for deer sign, but long and sad and terrible experience has taught all of its kind that

they also must constantly watch for the guns, bullets and dogs of men.

In my many years of wilderness traveling, I have seen mountain lions in the wild only three times. Once was in the jungles of Panama. In the Trinity Mountains I caught a weird glimpse of the great head of a lion who was following me, outlined against the full summer moon. The curiosity, rather than hostility, of the lion I sighted was shown by the way the head and ears were cocked toward me, in an attitude that plainly said: "What in the world are you doing alone up in the mountains at this time of night?" Had the ears been laid back and the tail lashing from side to side, I would have been in grave danger. Lions very rarely follow men to attack them, but almost always because they are curious.

Because of being so often hunted, the mountain lion has learned to use its voice as little as possible, though its noises, when it makes them, can be quite awe-inspiring. I have never heard a mountain lion scream in the wild, but have twice heard the weird, womanlike scream in zoos. Heard on a dark night in the mountains or woods, the cry of the mountain lion could make your hair stand on end. Even in the zoo, the shrill, trilling, weird and startling sound, commencing low in pitch and gradually rising to a crescendo, caused my heart to jump with alarm. The cry seemed part human, part angry and part questioning — altogether uncanny. It expressed an emotion that was half the longing of a male calling a female, and half the anxiety to keep other males away.

I have seen two mountain lions growl and spit at each other like angry cats. Sometimes, in the wild, the males get into terrible fights over a female, though often by



his ferocious noises and snarling face the bigger animal bluffs the smaller into running away. The female herself at first snarls, snaps and swats at the male who approaches her, but, if she is in mating condition, she gradually allows him to come closer until the two are licking each others' bodies, rubbing together and purring like two giant tabbies. A male lion may call to his mate with a kind of "Whoo-ee!" — probably asking her to join him. He uses a terrible cry, somewhere between a scream and a growl, to warn her of danger.

The mountain lion usually stalks or lies in wait for deer, which are its principal prey. The lion I saw stalking a buck in the forest of the Yolla Bolly Mountains in northern California inched forward with great care, only the black tip of its tail moving — possibly to signal other lions that this was this one's game. The ears lay back just before the spring, and all the muscles gathered together for the great leap.

THE WILD DOGS

The common native wild dogs of North America are the wolf, the coyote, the red fox, the gray fox, and the kit

fox. Many of the actions and languages of these animals are very similar to that of the tame dog (described in Chapter 2), but some are more typical of wild creatures. In traveling, for example, a dog is apt to go in a straight line, while a coyote or fox, unless in a hurry, will investigate every bush or clump of grass for a possible mouse, rabbit or squirrel. Also grown wild dogs rarely show the wriggling, puppylike attitude of tame dogs, though they do wag tails as a sign of friendliness.

Since members of the dog family depend largely on smell for tracking down their prey, it is natural that smell has a far richer meaning to them than it does to cats, who depend more on sight. The nose of a wolf, coyote, or fox is a delicate instrument that sifts out the tiniest smells from the breeze and reads from them many messages of vital interest.

Most of the dog family leave signal smell stations at strategic places, which is done simply by wetting a bush, a tree trunk, a clump of grass or a rock. After wetting, the animal, if a male, usually scratches hard on the ground with the hind feet, which may also leave a message as to his size. If a member of the same species comes later to this smell station, he sniffs it all over, gets the message and then wets it down to leave his own message.

You can often see what message he is getting if you watch closely. If it is a male who shows great eagerness over what he smells, and if he whines, this is usually because he smells a female who is lonely. If the animal shows indifference, then the message probably tells him the other is a much smaller male or a female that is not potentially interested in him. If he bristles, flattens his ears, growls and scratches the ground strongly with stiff

hind legs, he has probably caught the smell of a dangerous male.

For pack hunting animals such as the wolves, and occasionally the coyotes, the smell stations may act as gathering signs for the pack, the animals following down the smell stations until they find the pack. Newcomers have been known to roll their bodies in this pack scent in order to make themselves more acceptable to the pack.

Wolves are probably the most highly organized mammals of North America outside of man. A wolf pack in action is a thing of machinelike deadliness. After the prey is chased for miles until it is too tired and must turn at last at bay, the pack closes in on all sides with the scientific timing of a championship basketball team. It hamstrings the hunted animal before it knows what has struck it, tears open the throat and brings it crying to the ground, all in a few swift, slashing movements.

The wolf pack is a good deal more efficient than even the best pack of hunting hounds, largely because the wolf leader is right there with the pack, while the true leader of the pack hounds is the man who follows far behind them. The wolf leader gives commands almost entirely by the action and appearance of body and face, and any disobedience or stupidity is swiftly punished by a slash of terrible teeth. When the leader feints as if to grab for the leg of a buck deer, this is often a signal for another wolf to make exactly the same feint from the other side. As the deer whirls frantically to protect both flanks, a third wolf sees a hind leg coming near him, and dives in and slashes through muscle and sinew with one powerful snap and jerk of his mighty jaws, thus hamstringing the deer.

The male and female wolf generally mate for life, and this leads usually to a very intelligent and intensive rearing of the cubs to prepare them for life in the pack. Instant obedience must be taught at an early age, as this is the law of the pack. A naturalist once watched a father wolf leading his family across the tundra of northern Canada. The mother wolf acted as rear guard while the cubs were strung out in single file between. The father, who was about two hundred feet in front of the cubs, reached a rise of ground and stopped to look ahead. Back and forth swung the long wolf nose, testing the air for smell. Then he swung his head around and looked at the cubs. Not a sound was made, but the three young ones stopped still in their tracks as if they had been speared to the ground. The big father watched and sniffed for a while, then swung his head back to look at his children once more. Something — the way he moved his head, or the curve of his lips, or the look of his eyes — told them everything was all right, and they trotted on once more.

The mating season of wolves is generally between January and March. It is during this time that the females choose their mates and the males battle for mastery. But the female does not always choose the male who has won the fight: she may join the loser and drive off the winner.

The preliminaries for battle are similar to those for dogs. But in the wolf's fight there is even more effort to oppose teeth to teeth. As with dogs, if one wolf feels he is losing, he can beg for mercy by suddenly exposing his throat to the other.

Besides the language of movement, wolves have a more complex language of sounds than do most other animals.

European wolves have been reported to have ten sound groups, each conveying a wide variety of meanings. Let us see if we can divide up the chief sounds of American wolves into numbered meanings.

(1) Young wolves whine for their mother when they are lonely, and she may answer them with an inquiring whine. It is as if they cried: "Mother, Mother! Where are you? We are hungry!" — and she answered back: "I am coming with food. Are you all safe?"

(2) When the young bark, it is either a part of the language of play — hide-and-seek and so forth — or it may be used on a higher note and with the whine, to send forth a desperate cry of hunger. If it becomes too loud, the returning mother hurls a short, deep growl at them, meaning "Silence!" There is generally instant obedience. Wolves also may bark as a command to follow, meaning: "I have found something! Come see it."

(3) The growls of wolves, especially the big males, are usually coarse and deep. Many dogs are so intimidated by the fierce threat of this growl that they dare not attack a wolf. The growl is also used by the wolf, along with the snarling face and raised hackles of hair, to bluff a lesser wolf.

These growls may be used by the mother and father wolf to warn the cubs to lie still or to come forward, or for other commands. Usually no second growl is needed, as the cub knows he will get a severe nip if he does not obey. The growl of the mother is also used to warn strangers away from her cubs and den.

(4) A snarling whine is used by the cubs in play and during mock battles. It is high-pitched, and rises still higher when the cub is both hurt and angry. It may

mean the cub is in high spirits and is trying to dominate his companions.

(5) A musical, long, smooth howl (similar to that of large dogs of wolf ancestry) is the mustering or rallying cry, and is a wonderfully stirring thing to hear on a winter night in the northland when the leader wolf of a pack stands at a high place in the forest and throws forth this far-carrying cry.

(6) As the gathered pack sweeps together through the dark forest, a series of high-pitched howls rise from them, vibrating on two notes. This is the hunting song of the pack in full cry on the trail of a deer or caribou. To the frightened game, it is a song of death.

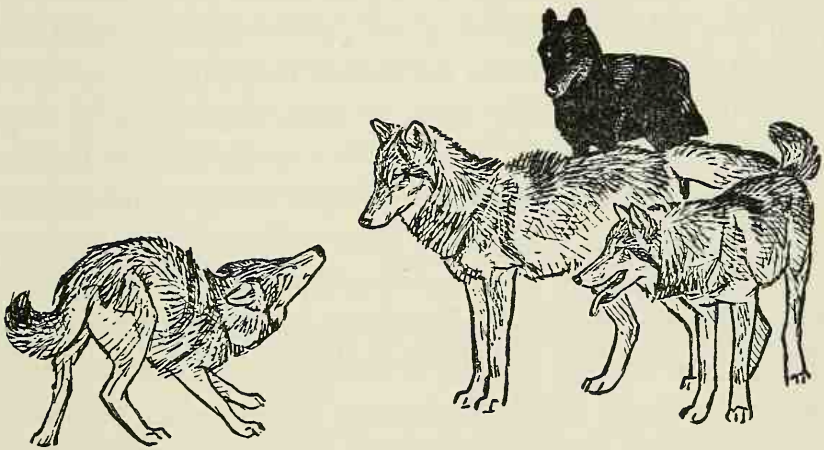
(7) Suddenly the pack breaks into a louder, different note, for they have caught sight of their prey, running ahead of them over the snow. There is a deep yelp of eagerness in this howl, almost a yammering, and an expression of bloodthirsty desire. The poor deer is frightened into redoubling its energies and plunges forward recklessly. This is exactly what the pack wanted when it gave its yell, for the new surge of energy soon tires the deer, and thus makes it an easier prey.

(8) Now the frightened deer begins to stagger and the pack swings out to surround it, giving a series of short, sharp barks and howls that is the killing song. First, this song tells the leader where each of his followers is so he can more easily direct the attack. Second, it frightens and confuses the deer more than ever and so makes killing easier. In a few seconds the pack closes in, avoiding the flying hoofs. Feint to the right, feint to the left, then strike — and the deer, hamstrung on both hind legs, sinks helplessly to the ground. It is usually the leader's privilege to

jump for the throat and have the first taste of warm blood.

(9) Sometimes a howl is heard that seems to sound like all the loneliness of the world. It comes from a lone wolf on a far hill. In it is something of the rallying cry, and the hunting and the killing song, and something else also. It is a song of despair, usually sung when the wolf feels all its companions are dead and it alone is left in the world.

Much of wolf language can be found in the story of dogs talking to dogs. (Chapter 2.)



If a wolf wishes to join a strange pack, it approaches with waving tail. It may even act playful, like a pup, and turn over on its back with legs waving in the air when the pack approaches. Sometimes this works, and it is accepted into the pack after a few perfunctory bites to try its mettle. At other times it is harried unmercifully, bitten and rolled over and over by bullies in the pack. And on some occasions the pack has quickly killed the strange wolf.

The coyote is a more appealing animal in many ways than the wolf, not so untamable and far more adaptable to the presence of man. Whereas the wolf has retreated before man and his guns, traps, and poison into the farthest wildernesses, the coyote has spread to new places because of the opening up of the country by the felling of timber, and possibly also because of the destruction of the wolf, who is a deadly enemy of the coyote.

The coyote pack is not common, nor is it as efficient or as large as that of the wolves. Coyotes occasionally gather in small, loosely formed packs to hunt. Their habits are even more doglike than the wolf's, but like the wolf they usually mate for life and the father helps take care of the young ones, something rare or nonexistent among dogs.

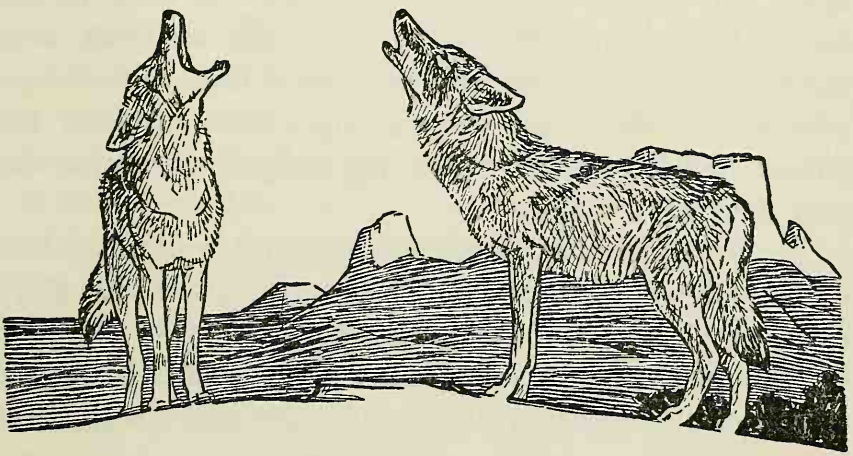
One coyote father I watched for some time in the San Francisco zoo was extremely proud of his children, and stood guard over them with great vigilance and courage. At the approach of a visitor near the bars, he would rush forward with bristling mane, snapping teeth and a savage growl deep in this throat. If he thought there was real danger, a sharp bark of warning would send the young ones scurrying for the rear of the cage where they would cluster behind the equally bristling mother. It was amusing to see the father look at the young coyotes as if they were the most wonderful things on earth. When he was sure conditions were safe, he would lick them around the ears and neck with a proud paternal expression, as if to say: "These beautiful creatures are really mine!"

In the wild, when I have come in the neighborhood of a coyote family, I have heard the mother give a long-drawn-out and very quavering squall as a warning to her young. Sometimes two or even three mothers have dens

together, or an old maid or a grandmother may come to help with the young ones.

Out of such groupings of families and possibly of others who are closely related arise the small coyote packs that sometimes gather together to round up and chase down jack rabbits or even attack a wounded or sick deer or a calf they have separated from the cow.

These packs like to get together on beautiful Western nights and sing to the stars or the moon. Their singing, in simplest form, is a series of yaps, almost like laughter, followed by a long squall. The sound is often ventriloquial: you seem to hear them calling from one hilltop, when actually they are singing on another one a mile away. When several coyotes join together the sound becomes quite tremendous in volume, and filled with a wild longing that is enjoyed by every true outdoorsman or woman. Often an amazing combination of whines, barks, howls and wails rise and fall in the desert night. One night, when I listened to them in the Arizona desert, it seemed as if the sound came from every side of me,



sweeping down from the dark buttes and hilltops like a chorus of surrounding demons, and trailing away finally in a last, long, fading howl.

The song of the coyotes when gathered together is very much like a "social sing" of men, and expresses high good spirits and the joy of companionship. But a single coyote male singing from some high hill is likely to be trying to find a mate. Then the sound seems lonely and wild, filled with deep sad notes and a sense of laughter through tears. The females are no doubt attracted to this song, if well done — even as human females are attracted to a romantic male singer.

Coyotes are famous for their wisdom, cleverness and cooperation in catching animal prey. A coyote male touches noses with his mate and by this signal tells her to sit down and wait for him to call her. Then he marches, singing merrily, through a prairie-dog town. The little rodents immediately dive into their holes, and, as soon as they do, the male gives one sharp bark. At this signal, the female rushes forward and hides behind a bush, right by a prairie-dog hole. The male takes up his song again and walks on through the town. As soon as the prairie dogs hear him singing off in the distance, they think all danger is gone and pop out of their holes to see what that crazy fellow was singing about. Instantly the female coyote pounces on the dog nearest her, and so the wise ones get a meal!

Two or three or even more coyotes often join together to chase down a jack rabbit. There is little need for more than the language of motion, as they all know the jack will run in a great circle. So, after a jack rabbit is started, one coyote chases him, while the other two watch care-

fully to see which way the jack will circle. As soon as they are sure, they trot off across country in such a way as to intersect the circle. When the running coyote begins to get tired, he gives a series of sharp barks, and the next coyote sneaks through the brush toward the sound so that when the frightened jack comes near he can spring out on him. The jack dodges the slashing teeth like a flash and runs on, but he constantly has a fresh coyote on his heels while the other rests by walking slowly toward another point in the circle. Round and round the jack goes, until, utterly exhausted, he is an easy prey for the last coyote who chases him!

Coyotes, like wolves and dogs, leave their scent signals on bushes and in mountain paths. From these a new coyote reads the stories of other coyotes who have gone by before him.

The elegant and clever red fox is one of the most charming and interesting animal characters of North America. In the woods of New Jersey a friend of mine once watched a red fox stalking mice. Unaware of my friend's presence, the fox moved through the grass with the grace of a ballet dancer, each prettily furred foot put down with such care that not a sound was made. When the mouse was sighted, the sharp nose pointed directly to it, the ears cocked forward eagerly and the fox began to ooze forward so slowly that it hardly seemed to be moving. Suddenly the muscles of the thighs bunched tightly, the ears drew back and the red body hurtled forward. There was a sharp snarl, a squeak — and the jaws snapped together on something soft.

In captivity the red fox shows a marvelously expressive face that is a key to a very cunning and complex character. In the wild this character is clever in its ability to live successfully in and around the farms of men. The abandoned farm, where cut-over and once-plowed land is growing up again with bushes and grassy meadows, is the red fox's favorite hangout.

The face of the red fox undoubtedly signals to its own kind how it feels. In a snarl it expresses enough fury to bluff a rival. The black lips draw back from the red gums and sharp white teeth. The eyes become slits of rage.

The fox face has also been observed laughing at the bungling of a dog or man. In such a case the lips seem to stretch in an actual grin, and the tongue hangs out and shakes, like the sides of a jolly fat man.

When expressing alert watchfulness, the ears cock forward, then sidewards, and the whole face takes on an attitude of animated curiosity.

The voice is almost as varied. The cry of the male is notably coarse and heavy, while the female's cry is usually very shrill. A short bark, followed by a little squall-like "Yap-yur!" is apparently the hunting cry of early evening, a warning to other foxes to stay away from the territory being hunted.

A long yowl is probably the male's call to a female at mating time, as it often has a note of loneliness in it, and the female answers with a characteristic shrill squall. As the two sounds grow closer together, they may change gradually into sharp eager barks from the male and answering squalls or barks from the female. The female may repel the male at first with snarls and bites before she decides she likes him.

Red foxes have been known to give two or three different screeches. The meanings of these are clear once you have observed the foxes' emotional moods. By the tone of the sound it expresses anger or fear, or pain, or warning. Red foxes have been known to screech and squall to rouse dogs to chase them. The fox may occasionally yap to encourage the dog to keep on following.

On moonlight nights foxes have been known to chase each other about, barking loudly, and making soft churring noises of good fellowship. These sounds are far different from the coarse and savage screeches and snarls of two male foxes approaching each other to give battle.

One of the most sinister and unearthly noises of the North American wilderness is the terrible scream of a male fox when he is being attacked by superior forces, or

is trapped. This frightful noise may bring help or may bluff a large enemy. The vixen (female fox) has been known to squawk and squall like a heron in similar circumstances.

The mother fox gives a sharp bark to warn her young to dive into the den when danger nears, and to be quiet. She may then circle away with many yaps, trying to draw the enemy into following her and leaving the youngsters alone. Later, if successful, she will return in triumph to her home and call the young out with a soft bark or churr.

I have watched the gray fox in the Western wilderness several times, delighted with its quick motions, expressive face and appealing character, but this kind has little of the cleverness of its red cousin. The gray fox runs straight away from a chasing dog, with few of the tricks, like running in water or doubling tracks, so often used by the red. The gray usually heads straight for impenetrable brush or rock piles where he feels a dog cannot enter. Sometimes he crawls into an abandoned badger hole, or climbs a tree when the trunk is sufficiently slanting. He has even been found sixty feet up in the nest of a hawk or crow!

In the winter the short, sharp, hoarse barks of the males in mating mood are answered by the shriller barks of the females. The voice of the gray fox is coarser and deeper than that of the red fox, and the males are noted for vicious fighting. Messages, as with the other foxes, are also left in scent posts along the trails. The cries of the young and the warning cries of the adults are similar to those of the red fox (see page 85).

The gray fox sometimes gives a high-pitched, soft whine, almost not hearable, when it catches sight of an animal it wants to eat, and this may be used as a signal between a hunting couple.

Another cry is a miserable-sounding harsh squall when it has missed a mouse or rabbit for which it jumped, or is otherwise frustrated or angry. I kept two little gray foxes in captivity once for several weeks and heard this squall once when they were very hungry. Their faces were always very expressive — whether of mischief, of anger, or curiosity, or of some other emotion — and they were extremely fast and nervous in their reactions. I was glad to let them go free.

On full moon nights in the desert in Death Valley, California, I have watched kit foxes come down to the edge of our campfire light and skitter back and forth like little gray goblins, waiting for a bit of food to be thrown to them. The soft barking of the kit fox in the desert night is a sound more magical than real. This barking becomes louder in the mating season, around the first part of February; and with it may be heard a cry like an owl's screech. The barking, I think, is a signal of food found, or a territory call; when given with an angry tone it is a challenge from one male to another. The screech is probably a cry of angry bluff when two males meet in rivalry for the hand of a female. Another screech I think is given when the fox misses an animal in a pounce, or when some other hunter seizes its food. The ears flattening down are a sign of danger, as is the sudden dropping of the tail.

The common earless seal of our coasts is also called the leopard or harbor seal, and grows to be about six feet long. These seals mate indiscriminately without family life except for the female with her young, but they do like to gather socially in large and small herds that travel over the seas together. The association seems to be rather loose and there is little cooperation observed in hunting for fish, though no doubt the excitement of one leopard seal as it finds a school of fish is quickly communicated by its actions, the sight of which brings over other seals to join in the chase.

As these seals lie on the rocks or ice, certain individuals appear to take on the job of being sentinels. When danger approaches, a chorus of loud, short and sharp barks sends all the nearby seals bouncing into the water.

The bark may be a challenge and a warning to others to stay away from a particular territory. It is also used for social communication, as the seals travel together through the sea. Another warning as well as challenging sound is the deep snort of the male, which is also used to impress nearby females at breeding time.

Baby seals cry something that sounds like "Mama!" when they are hungry or lost — a baaing almost like lambs. They give a more desperate "Kroo-oo-ah!" cry if Mama does not come when expected. Each mother knows her baby by scent, which she absorbed when she licked it all over at birth.

The sea lions, which I have watched for hours on the rocky islands and beaches of the California coast, are far more fascinating animals. The great male, two or

WDB

three times as big as the slim female, has a huge-muscled shoulder and back, like that of a grizzly bear, and is lord of a small harem of one to twenty females. In the spring breeding season the bellowing of the males as they fight can be heard for miles. Each male stakes out his own territory on the rocks and attempts to corral a group of females.

The bellow of a male sea lion turns into a loud roar when he rushes at an enemy to drive him from this territory. The two move their heads like striking rattlesnakes, each trying to seize the other by a flipper or an ear. Often the battle goes on for many minutes with only the clash of teeth against teeth until one animal, badly wounded on a flipper or around the head, gives a bellow of despair and turns and runs for the sea. After him the winning bull sends a deep, hoarse bellow of triumph, and proudly tucks his head against his shoulders while the nearby females look on admiringly and may bark softly among themselves.

The female has a weaker, shriller cry than the male, but nevertheless it is quite loud and, when a whole herd of sea lions are talking to one another, it makes quite a din! By watching the animals carefully as they roar and bark and whine, you can gradually begin to make something out of the confusion. A big bull roars a protest because a young seal has bumped into the large one's tail while he was snoozing. He may lift his whole body up and sway it in the air while he roars, or he may turn swiftly around and dart his head with its big dog teeth right at the disturber.

A shriller bark from a female is for her baby to come out of the sea and get up on the rocks. You can

detect the worry in her voice. She thinks there may be killer whales or sharks near, and she doesn't think he is old enough yet to take care of himself. With a whining bark or mew a youngster is calling for its mother's milk. And over on one rock two young bachelor bulls are having an argument, during which they practice bellowing with all the viciousness and ardor of big males. Sometimes a bull, or even a cow, may snort a warning that will cause every sea lion in the sea to come rushing for the rocks. The meaning of the sound is clear; it means "Killer whales!" Ever since I saw the sea turn red with sea-lion blood near the Farallon Islands one day, I have understood the sea lions' almost hysterical fear of these great wolves of the sea with their high black fins.

While the eared seals, such as the sea lion and fur seal, can move about quite agilely on the beaches and rocks because of their jointed hind flippers that act like legs, it is in the sea that their true beauty of movement is observed. Down into the darkening surface zones they go like diving bullets, chasing the fish of the depths, a row of bubbles streaming from each nostril. Here below the sea surface the language is purely one of movement, the direction of the driving, churning body and flippers telling other sea lions not only that fish are here, but also that the particular fish this particular sea lion is chasing belongs to him alone.

Captive female California sea lions are the ones most often seen performing in zoos and circuses, because of their considerable intelligence and the ease with which they learn tricks. They bark beggingly for food, clap their flippers proudly together when some special trick is accomplished, and make enormous leaps from the water

over obstructions — if only a good reward of fish is furnished them at the end.

THE BEAR FAMILY

Bears are built for strength rather than speed, and so are eaters of about everything they can find, including vegetable as well as animal food. This omnivorous diet makes their temperament and ways somewhat different from those of the single-minded meat hunters, such as the weasels, cats and wild dogs. They are inclined to be more lazy and placid and greater seekers of comfort — especially during the winter, when they go into hibernation, while the other animals must struggle to stay alive.

Bears are extremely shortsighted creatures, which means they live mainly in a world of scent and sound. A bear, when he sights a man, often starts to circle upwind to catch the scent and discover just what this creature is. Then — with a loud "Whoof!" — it wheels and runs.

The black bear is a somewhat more jolly and comical fellow than the usually dour-natured grizzly. It is not above acting like a clown, especially if this may win some extra food. Like a grizzly, it claws the bark of trees as high as it can reach, probably to show strength and size, as well as to sharpen claws. You can tell a black bear's mark by the sign of four claws. A grizzly gashes the tree with five claws.

Besides leaving claw marks, the black bear (and the brown and cinnamon are simply varieties of the black)

often plasters a tree with mud and rubs against this mud with its back, leaving both hair and bear smell. This is a complete bear-identification message for the next bear who comes along. Male bears, in particular, study these "bear trees" carefully, and then try to claw higher than those who were there before them. The highest mark may warn others that a really big bear is in the neighborhood, and that smaller males had better clear out.

Every wild bear I have met in the mountains of northern California gave that startled "Whoof!" as soon as it smelled me, and rushed pell-mell into the brush. The noise, as heard by other bears, would certainly mean "Danger!" One cub I met quickly climbed a pine tree and disappeared among the branches. It was very quiet, which led me to believe its mother was not near.

Many people are injured every year in the national parks because they become too friendly with the park bears and do not understand their language. When such bears lose their fear of men they become first-class highway robbers and night marauders. In the Yellowstone Park I spent most of three whole nights chasing bears away from our canvas-covered trailer. Once a mother and two cubs climbed on top of the trailer and started tearing at the canvas. Only by flashing a strong flashlight in their eyes and yelling at the top of my lungs was I able to drive them away. Growling, with ears laid back, they edged off, since my bluff was louder than theirs!

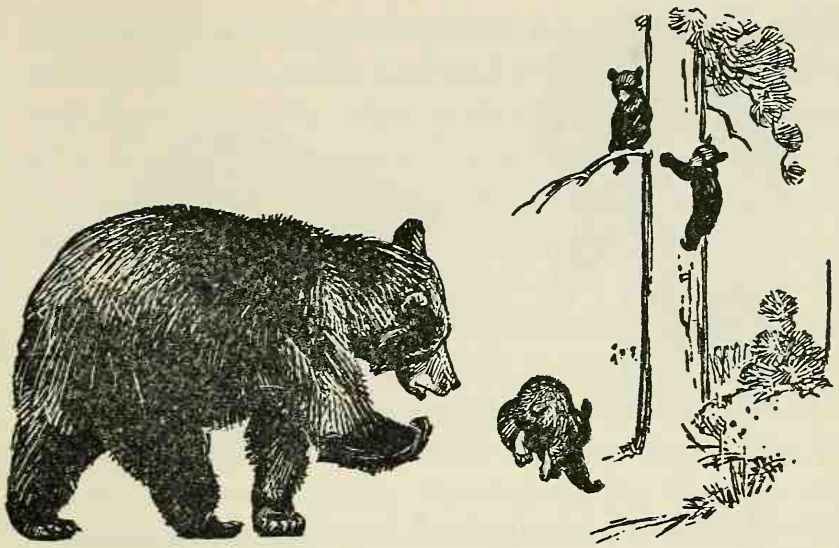
Tourists who stop to feed bears on the highway in the national parks are courting danger, because they do not realize that the bear is a large and savage animal who, when its appetite is aroused, is inclined to take everything it can get. Such a bear may try not only a sandwich that

is being held out to him, but also the hand that is holding it! But holding back food from a hungry bear is even more dangerous. The tourist will see it lay back its ears — a sure danger sign — and lift its lips to show its teeth in a snarl. A wise traveler steps on the gas at this point, and gets out of there in a hurry!

Like most animals, bears have a language of movement as well as of sound. Most of us have seen the bear clown at the zoo who sits on its tail end, grabs its hind feet with its front paws and sways back and forth like an animated rocking chair, while craning its head and neck in a pleading motion. This is sheer, shameless beggary, but this bear certainly gets away with it. Soon the peanuts begin to fall.

A playful bear likes to start play with a comrade by running up and playfully nipping the rear end. The other bear, often too lazy to move much, falls over on his back and strikes at his tormentor with both forepaws. In an instant the two are rolling over and over in an ungainly wrestling match that is mainly pure fun, but can turn into a semi-serious scuffle if one of them bites or strikes too hard. In watching this play fighting you will seldom see anything like the so-called "bear hug." A bear does not crush its enemy with a hug, but may reach out and grab with the forepaws in order to bring the other animal close enough to bite.

Bear mothers seldom believe in sparing the rod and spoiling the child. If a bear cub does not get up a tree fast enough when told to by a grunt or growl from Mama, he is liable to be knocked halfway up the tree with a blow! There is good reason why the lesson of discipline must be taught quickly, because there are many animals lurking



in the woods that would be happy to gobble up a tender young cub. Soon the cub learns that a hoarse grunt from mother bear means for him to climb a tree and fast.

The mother is quite affectionate with her cubs when in the mood, and grunts fondly when she finds a lost cub, licking him all over. Cubs whine and whimper loudly when they are hungry, but are hushed up in a hurry by a low growl if danger is near. A peculiar, whimpering, high-pitched moan is given by a cub to call its mother when it is lost.

Once I heard a caged bear make a prolonged murmuring, whimpering sound, and thought at first it was sick or hurt. But it was lying luxuriously in the sunlight and its later actions showed it was quite healthy. Apparently the sound was one of pure contentment and well-being.

Many other sounds give very different meanings. There is the growl that is a threat and a bluff. There is the loud

cough of menace when the bear is getting ready to attack you. This sound is also given when two male bears are about to fight. The bear with the deeper cough and larger size may bluff its adversary into turning and running.

That a bear can be a coward, or perhaps just realize it has no chance in a fight, was shown once to a naturalist who observed a small black bear in a fight with a mountain lion. The bear fought back only when actually attacked; otherwise it rocked back and forth with its back to a cliff, moaning and screaming. It was trying to tell its enemy that it did not want to fight at all; but this apparently did not work, because the bear was soon killed.

Some black bears bawl like a bull when in rage or pain. This cry may also be used to ask for help, if a mate is near, and is often heard when a bear is caught in a trap. The hoarse, panting, coughing roar of a big male bear in anger is usually broken by savage snarls and many a violent "Woof!"

The male and female black bears at mating time are

often extremely affectionate and conversational, rubbing noses and sides, sniffing at each other, grunting, whining and moaning softly. Most of these sounds simply express affection in various tones. The same is true of the grunts, mumbles, whines and squeaks often heard between a bear mother and her cubs.

The grizzly bear is distinguished from the black bear by its larger size, the muscle hump in the shoulders and the much larger, heavier claws. Besides their marks of five claws, the signs grizzlies leave on trees may differ from those of black bears by showing places high up where grizzlies sometimes bite out big chunks of bark.

Grizzly psychology has considerably changed over the last hundred and fifty years since the coming of the white man and his gun. Now grizzlies hide from men and rarely attack unless wounded. Grizzlies occasionally kill a large animal, such as an elk or moose, by rushing the other animal from some hiding place, frightening it with a terror-striking roar and grabbing it by the neck to throw it to the ground and kill it. After such a kill, the grizzly eats as much as he can, then rakes some fresh dirt over the carcass. This dirt and the smell left with it warns all other creatures: "Leave this alone! I'll be back to eat soon!" Few animals dare to ignore this warning.

Mother grizzlies talk with their cubs as do black bears. When the mother wants to leave a dangerous neighborhood in a hurry, she gives a short, choppy, coughing sound that brings the cubs close to her side as she runs away through the brush. Once or twice she rises high on her hind legs and turns to look back, sniffing vigorously to see if the danger is still near.

This rising to sniff the wind is a common signal among bears when they are uneasy about something. Other bears see the first bear sniff and quickly catch the same uneasiness. They too rise and sniff the air, swinging their bodies and necks from side to side. If the ears lie back and a low growl rises like thunder in the throat while the breath comes quickly and harshly, it is a sign of an enemy approaching.

Most of the year, except for mothers with cubs, grizzlies are solitary animals, more grumpy and bad-tempered than black bears. During the mating season, in late summer, the big males become more noisy — coughing, growling, grunting, moaning and roaring. The females answer in kind, but with higher notes. The coughs — "Koff-koff-koff!" — and grunts are usually the calling notes of the bears, trying to contact each other. Fights between males are similar to those of black bears (page 96).

The raccoon is a little cousin to the bears. Like them, it walks with its hind heels on the ground, and so indeed "walks like a man." But the raccoon is one of the wisest and cleverest of all animals, particularly if fate and natural ability have allowed him to live a few years. He is the sage of the woods. A wise raccoon may know more tricks for getting out of trouble than even the red fox.

The raccoon often has a sociable family life, but some old males become quite solitary. When two family groups get together, you are bound to hear the querulous "Churr-churr-churr!" of the adults squabbling over food, or the soft "Er-er-er-er?" of a young one begging food from its mother.

The front hands of a raccoon, so much like a man's with their apposable thumbs, no doubt help account for some of the raccoon's cleverness, including the opening of chickenhouse doors. I once watched a raccoon mother pass some chicken intestines to her two young ones and the passing back and forth was exactly as humans might do. Each child took its bit of food and sniffed it over carefully, then took it to some nearby running water to wash it before eating. This washing apparently is to help them swallow the food and not for sanitary reasons as once thought.

The raccoon's face is very expressive. I once watched a raccoon wrinkle its nose in distaste when it found a bug with a bad smell and spit the bug out with every indication of displeasure. Another coon, seeing this facial expression, also made a grimace and threw away the offending bug. The coon also expresses rage, fear, suspicion and curiosity with its facial muscles and the way it curls its black lips back over sharp white teeth.

A coon expresses alertness and alarm over possible danger by crouching low, with its head and ears cocked toward a strange sound, the nose sniffing to catch the smell. It may express curiosity by rising on its hind legs and peering toward a strange object, sniffing deeply with its nose. A pet coon loves to explore and, with its clever hands, delights in opening drawers and emptying all their contents on the floor! Wild coons have been known to steal bright and shiny objects from cabins or camps very much as a pack rat does.

Coon families seem to mark out and claim definite hunting territories, like otters. Two coon families, meeting at a fishing pond both claim, may squabble, scold and fight half the night — with no one getting hurt very much, but everybody losing out on the fishing!

Ordinary conversation is by churring in different tones, one querulous tone being a young one eager to get going on an adventure, a deeper note being a mother telling the young ones to mind their manners or be quiet, and another note, with questioning or urging in it, being between two coons trying to decide which way to go on a hunt.

In the mating season male coons fight to the tune of savage growling and snarling, noises they also use when attacked by dogs. They use their front hands as well as their teeth, and have been known to drown dogs by pulling their heads under water in a pool or stream and holding them there. Two male coons approaching each other puff their bodies up and spread out their hair to look as large as possible. This, and a deep growling, may bluff a weaker raccoon into suddenly drooping its tail and hair and turning to run.

The mating song of the male is sometimes called a "whicker." It is a prolonged and very tremulous "Whoo-oo-oo-oo!" Sometimes it is mistaken for the voice of a screech owl, but it is much more squalling and coarser than the sweet, soft noise of the little owl. This song seems to express love, joy and vigor all rolled into one and may be answered by a similar but shriller song from the female, quivering through the night. Coons mate usually in midwinter, often for life, with the fathers helping to raise the young ones.

Coons are very careful in training their youngsters, teaching them tricks to avoid dogs, men and other enemies, and how to get food. I once watched a raccoon mother showing her youngsters how to catch fish with their hands in a pool. She had to scold them with sharp churrs several times to make them pay attention, and one could imagine her shaking her head when a young coon lunged for a fish with sloppy technique!

CHAPTER 4

Hoofs, Ears, Tails and Squeaks

Most of the animals described in this chapter have two things in common, they feed mainly on plant food, and they are hunted by the animals described in Chapter 3. A few, such as the bats and shrews, described at the end of this chapter, and some of the mice and rats, eat insects or even other animals. But they do not have the large, sharp teeth of true carnivores.

HOOFS

The deer, elk, mountain sheep and similar animals of North America all have in common hoofs and a liking for green things to eat. Many are noted for the horns they carry on their heads, which are used principally by the males in mating combat. They usually go together in herds or bands, at least at certain times of the year, in order to cooperate together for mutual defense, and from this banding comes a strong need for various kinds of communication. Since they are all preyed upon by the large carnivores and by man, they have found that the price of life is constant alertness.

THE DEER FAMILY

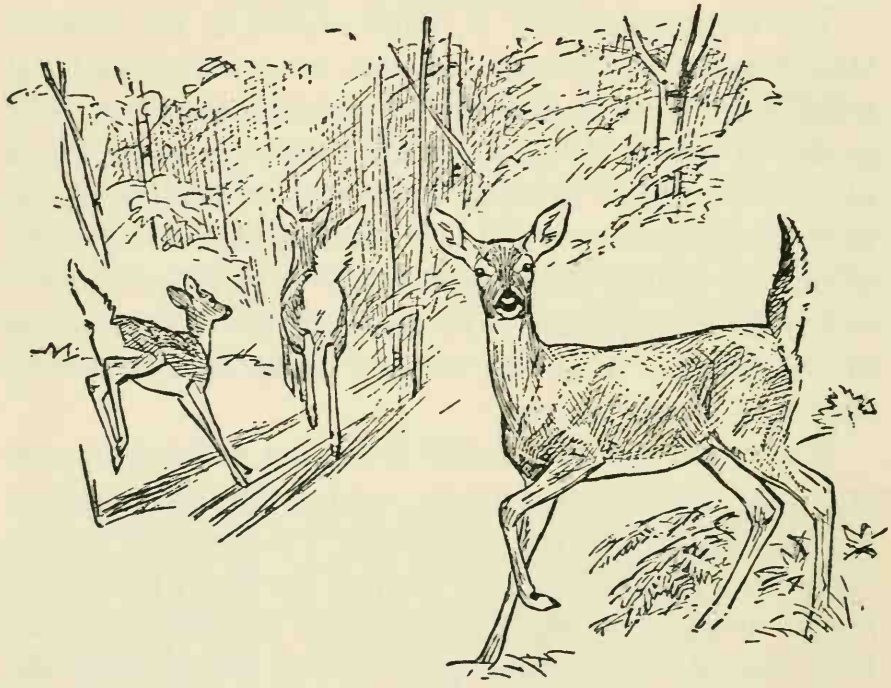
The deer family in North America includes the white-tailed and the mule deer, the elk, the moose and the caribou (with its relative, the imported reindeer, in Alaska). Some English roe deer have been imported into the Eastern states and seem to be growing in numbers there. Only the best-known species will be discussed here.

The white-tailed deer is found mainly in the Eastern United States and Canada, though it occurs in scattered areas in the West. In early spring the older bucks go off in groups of two or three, while the does form small bands of a half dozen or so made up of two or three does and their young of the previous year. In May each doe goes off alone to a hiding place to have her baby. The fawn instinctively stays perfectly still and merged with the colors of the ground, when the mother leaves it, but it may squeak if it gets hungry.

During the summer, as the young are growing up, the does may drift together again, seeking the help of others to guard against danger. A schedule is followed of resting in the cool shade during the heat of the day, and searching for food in the early evening and morning. At such times one doe may stand guard for a group while the others feed. At the lifting of her white tail and soft blaat of warning, the other deer turn in the direction she is running and flee the approaching enemy. The bucks, whose horns are just growing soft and velvety and delicate at this time of year, live separately, but may have their sentinels too.

A deer feeding in a meadow in the forest ducks its

head down and takes a few bites; then its tail moves and up comes its head while it looks carefully around, its ears spread wide to every sound and its nostrils flaring as it takes in the messages on the forest breeze. At a wrong smell or sound, a deer will snort, raise its tail, strike the ground a blow with its front hoofs, whirl, and leap away. All deer within sight see the flashing of the white tail and they too turn and run in the same direction.



By the middle of September the buck has cleaned most of the felt covering off his antlers and is going around through the forest butting at trees and pawing at the ground, getting ready for the battles of October and November. The fawns are weaned by their mothers this month, and the does begin to run restlessly alone. They are not yet ready for mating.

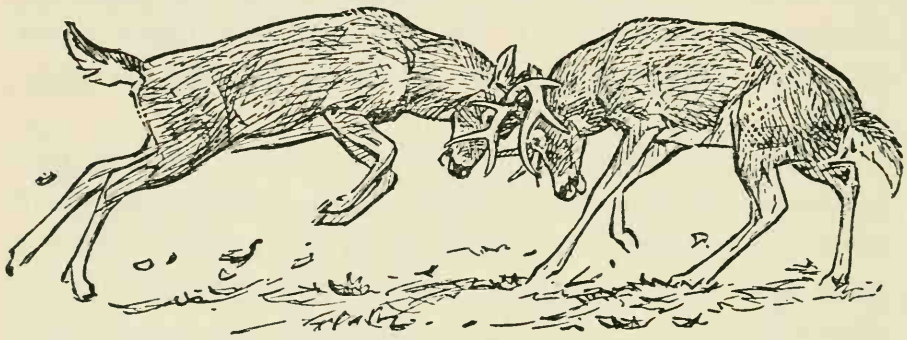
Bucks at this time of year make soiling pits, or wallows, where they tear up the ground into dust, put their own water in it, and in other ways make a smelly place to lie and rub their bodies. These wallows appear to be smell signal posts and also challenges. Possibly the deer who can make the biggest and smelliest wallow can convince other bucks that he is a dangerous fellow and they should run when they smell him. Certainly bucks are quite interested in each other's wallows and investigate them carefully. (See reactions of bucks to hunting on page 107.)

In October the doe begins to run with her head turned backward, looking to see if she is followed by a buck. If her tail is pressed down close to her body, this is often a good sign that a buck is chasing her and that she is pleased with him. Such deer are still aware of danger, and a commanding "Whoof!" from the buck will send the doe into concealment. A shrill whistle of warning may tell her to run. These signals may also be given by a buck who seeks to keep his doe from being captured by an enemy buck. The buck may also flash his white tail to warn the doe to run and in what direction to run. She flashes hers as an answer, and to show that she is obeying his command. If another buck approaches the buck challenges with a coarse whistle or snort.

The buck and doe nuzzle each other fondly at the time of mating, and their white tails constantly move up and down as a sign of affection. They may bleat for each other when separated, the buck with a deep, throaty blast that is almost a bellow.

Two bucks who clash over the same doe approach with a ritual that has probably been going on for many

centuries. They stamp and snort and advance a few feet, then give a bawling bleat, then stamp and snort and advance once more. The hair along the back of each stands straight up. The great shoulder and thigh muscles bunch for the charge. But the charge itself, when it comes, is only for a short distance. The horns clash and ring together as they meet; then back and forth the two press each other.



Each buck watches carefully any move on the other's part that indicates a dive for his flanks. He shifts his horns quickly to meet such an attack. Finally, one becomes more tired than the other; his tail begins to sag as a signal of his intention, he suddenly disengages his horns and wheels around to escape. In that moment, if he is not fast enough, the other buck will gore him in the side before he can get away.

A white-tailed deer that passed very close to me one day, chased by hounds, gave a high-pitched shriek of terror as it dodged past. Other calls that have been heard from these deer are a low muttering sound given by the buck when he is seeking a doe, a scolding cry of the mother to the fawn when the young one wanders near danger, and a soft bleat from the fawn calling its mother — almost a mew.

The mule deer of the Western United States are of two main kinds. The typical mule deer of the mountains has very large ears and a light brown color. It usually carries its tail dropped, and swings the black tuft back and forth over the white patch. The mule deer buck may, however, occasionally strut around with its tail nearly vertical, probably as a sign of confident powers. But the smaller black-tailed deer of the Pacific Coast carries its tail nearly level.

The mule deer may form into small bands during the winter (larger bands or herds in the more open desert country), but the blacktail rarely forms bands. The mule deer usually bounds over the ground with great, jolting jumps instead of skimming along close to the surface as does the whitetail. The motion of the blacktail is in between these two. But all three kinds of deer drop and quiver the tail when they are hit badly by a hunter's bullet.

In the early fall hunting season in the West both black-tailed and mule deer bucks go through a baptism of fire that sees more of the youthful and inexperienced bucks killed. The wise bucks hide in the deepest thickets and learn to run low to the ground at this season, instead of with their usual great jumps. They also have learned to hold perfectly still and give no alarm cry.

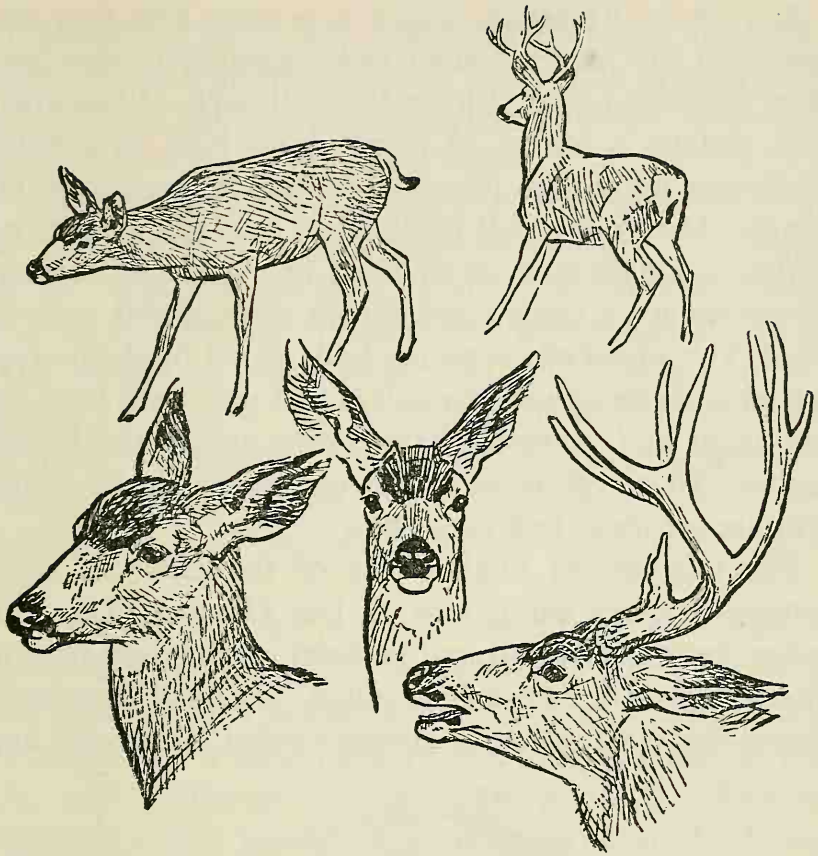
The mating time in the late fall sees the bucks uttering barking challenges to one another, also much snorting and stamping of feet. The does do not bleat as much as the white-tailed does do, but are rather silent creatures, answering their mates more by movements, such as twitching ears and tail. The tail pressed down usually means the doe is ready to mate, and both does and bucks play chasing games at this time, round and round through

the bushes and trees. As the buck chases after the doe, he may give a low and deep baa of warning to the fawns, who try to follow the mother, to get out of his way. If they do not, he may butt them not too gently with his horns. Fights between bucks are similar to those of the white-tailed deer (page 106).

The young are generally born in May and stay quietly in hidden places until they can run with their mothers. I stumbled on such a fawn once in the California mountains and it gave a quivering bleat of surprise and terror. But the first cry of the very young fawn is like the squeak of a rat. This gradually grows into a stronger bleat, a cry for food or protection. When the mother comes running, she bleats an answer, and her rump patch bristles if she senses danger. If there is no danger, the doe gives a soft murmuring sound of reassurance as she comes near the place where the fawn is hidden.

Each doe usually claims a territory at this time of year, and rushes at other does to butt and kick them if she thinks they are entering her territory. She bristles and her ears are laid back as she attacks. The bucks are off by themselves at this time, in small groups, and seem to show much less interest in territory claims.

During part of the year, particularly the winter and early spring, the mule deer of the more open country, such as the sagebrush desert, form into bands that are usually led by a wise old doe. If she sees something strange ahead, as she leads the way along a trail, she may snort or blow with curiosity and stamp her feet. This noise is partly to make the strange object or thing show whether it is alive or dead. All the other deer become alert at the sound. If the lead doe thinks it is dangerous, she gives a

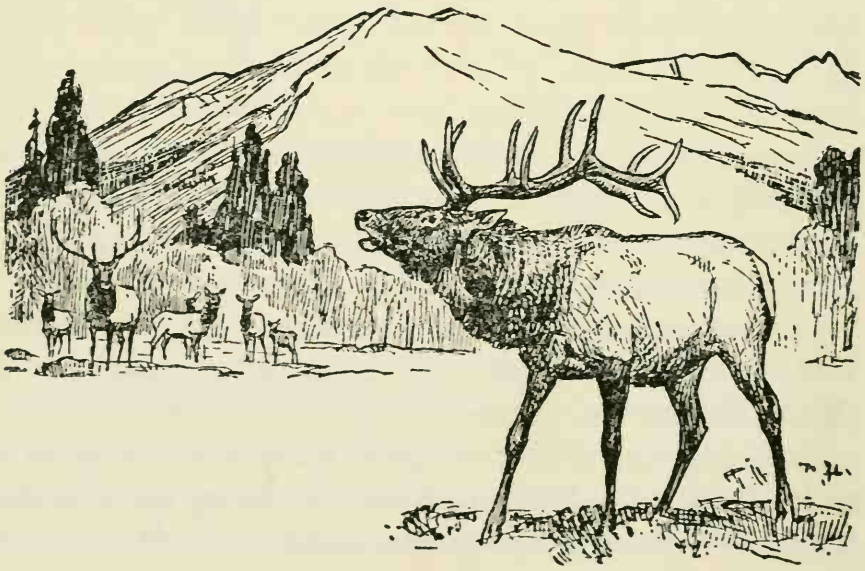


high-pitched whistle or snort that sends the whole herd pounding away in great leaps for cover. Mule deer of the woods and black-tailed deer have much smaller bands, often just one family.

Each mule deer has a scent gland on each foot and in the hock that it apparently uses for communication. These glands are rubbed against trees and the smell may be used to lead other deer to good pasture or along safe trails to water. A buck may use the strong smell of his glands to frighten away smaller bucks.

The elk or American wapiti is a large deer that has developed the harem system more completely than any other American deer. In the late fall each of the great bulls gathers a harem of cows about him, sometimes numbering more than twenty, and guards them from all comers. The young bull must break into this system by stealing a single cow or so from her lord and master. Sometimes he is caught and forced to fight and may be killed. The wisest of the young bulls go off by themselves to feed and strengthen themselves and wait until they are very large and powerful before they tackle the harem masters. To go off alone in this way is said to be a sign of future greatness in a young bull.

The magnificent bugling cry of the bull elk rings through Western mountains in late October. The bull gushes forth with a vast and guttural roaring that rises in pitch to the shrill tones of a trumpet, and finally reaches a whistle that is like a harsh, jarring scream. This fades and



drops back again to deep, guttural sounds that end with a series of fierce grunts. Only the great bulls in their prime can give the complete bugle. Younger bulls, because of their shriller tones, are called "squealers."

As two bulls cross a clearing to meet each other, the world seems to come to a standstill to watch. The manes of the bulls rise and their swollen neck-muscles bunch and throb. They snort loudly, paw the ground and shake their antlers at each other, then rush together with a jolting crash. The fight may go on for a long time of straining and pushing and pulling, of breaking away and crashing together again, or it may end quickly with a sudden goring of the weaker bull or with one turning to run.

During most of the year an elk herd is led by a wise old cow, while the bulls follow meekly behind or go off by themselves. I have passed near such a herd in Yellowstone Park and heard them noisily conversing together as they ate, with a series of squeals, bleats, and barks. Mothers bleated for their young not to stray too far away. Young does and bulls squealed with delight or half-rage as they chased each other, while an occasional barking cry might have been a call to come to better food. Another and more commanding bark, from the leading doe, meant something like: "Cut the foolishness and follow me!"

The bull is not the only one to bugle, as the mother elk may give a triumphant bugling cry after the birth of a fine calf. This is soon answered by the high-pitched bleat from the calf, demanding milk. A mother elk has been heard to give a sharp bark of warning and distress when a grizzly bear approached her young one. Other elk may come to help.

In stress of excitement and as a warning the hairs of the rump patch of adult elk are raised and displayed in a ripple of lighter color, as in most deer. At such a sign in a neighboring elk, other elk may turn and run.

In summer the bulls leave the main herds and move to the highest pastures in the mountains where they can avoid the flies and find safe places to grow their velvety horns. In late August such bulls have been seen to take part in a most remarkable dance. They move about ponderously in a circle with heads low to the ground, hoofs stamping and pawing up clouds of dust. The most likely purpose of this dance is simply to drive away flies and other insects that attack at this time of year, but it may be a social dance also.

Moose are the giants of the deer world and have been known to stand up to a grizzly bear in fair fight. They do not develop harems in the way of the elk, but a moose bull may visit several cows during the mating season.

The bull begins by mid-September to start looking for cows and continues the search for about a month. He searches particularly for open glades of hardwoods along the ridges and in these he searches with nose to the ground or lifted high to drink in the wind for some hint of a cow. His great ears flap back and forth listening, and every now and then he gives a deep grunt of "Oo-wah, Oo-wah!" or a short bellow. If he hears the long, mellow and hankering "Er-er-er-er!" of an eager cow, he goes crashing through the trees and brush as if they were not there. The cow not only calls the bull with a gentle bellow, but also with soft squeals and whines. She may run a short way, but soon waits for him. When the cow and bull meet

there is much grunting and mumbling, and much nosing of tail and head and rubbing of sides.

If the bull, instead of hearing a cow, hears the challenging grunt or bellow of another bull, he also rushes through the trees, but this time he makes a great noise of slashing the brush and branches with his widespread antlers, hoping to impress the other bull with his great size. He circles about to catch the wind from the enemy and bellows again and again. When the bulls get near each other, they approach more slowly and, with much grunting and stamping, try to maneuver for the best place to fight. The hair rises stiffly along their shoulders and neck and they seem to grow in size and strength. Again and again the brush is slashed with the heavy antlers. Then suddenly they charge together head on, their horns acting as both spears and shields.

The moose calves are generally born in May, when the cow seeks for a secluded island or swamp where she can feel safe from enemies. In a thicket of brush the mother hides her baby for a week or so. She soon brings her calf out to show the world, but, when danger comes, she gives a warning squeal that sends it running to hide. Then she lifts her head, pulls back her ears, snorts like a vicious horse, and bounds forward on her long legs, striking the ground savagely with her forefeet, her eyes red with rage. Bulls have been known to give a warning grunt that sends both cow and calf running for cover. The calf bawls for help something like a lamb, with a loud "Baa-baa-baa!"

Like the deer, bull moose make soiling pits or wallows in the fall, and the bad scent of these no doubt helps spread moose talk through the woods, telling of the big-

gest bulls. Moose make beaten-out yards in the snow in the winter to give them running space against enemies like the wolves, and here they often depend on the shrill cries of jays to warn them of danger.

The flexible nose of the moose expresses many emotions, such as fear, anger, disgust and love. I was sure that the big bull moose who once frightened a group of us into our car, with his foot-stamping, wrinkled his big nose and opened his mouth in a soundless laugh at the humans he had scared. Fear is shown by the narrowing of the nostrils, anger by the nostrils flaring outward, and disgust by repeated sniffs and shaking.

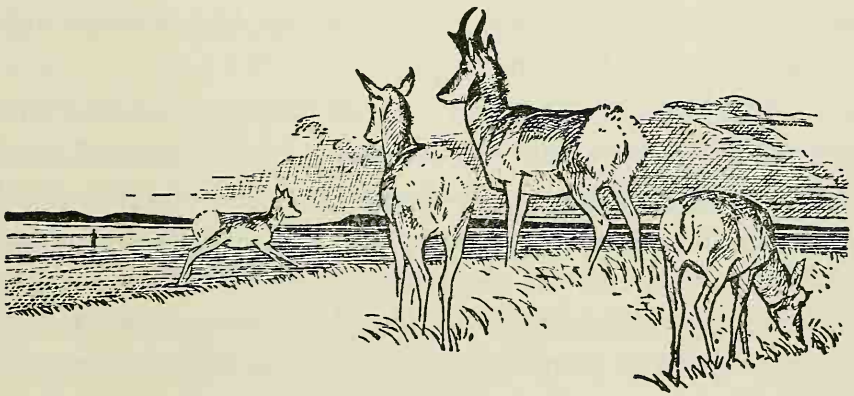
ANTELOPE

The pronghorn antelope is a creature of the open plains, where its tremendous speed and far-seeing eyes help preserve it from its enemies. Pronghorns are great racers and hate to have anything beat them. If a man on horseback races with an antelope, the antelope is delighted and tears off parallel with the horseman, keeping up about the same speed and toying with him for a minute or two. Then he suddenly puts on a tremendous burst, forges way ahead and cuts across in front. A magnificent male antelope once tried this when my wife and I were driving a car over the Colorado plains one day. At forty-five miles an hour we raced parallel with him for a full minute, then he put on a great effort and moved out ahead of us to swing over and cut across the road in front of us. Despite the rough road, however, I pushed down the accelerator and brought the car up even with him again, both of us going a full fifty miles an hour. The buck was running with neck stretched out and his legs

driving so fast they were only a blur, but he could not pass us.

Antelope have remarkable control over the hair on their body and can use it for signaling. The mane on the neck, especially a buck's, bristles erect when he is excited and angry, acting as a threat and bluff to another buck. But the white area on each hip of the antelope is much more effective as a signaling device. The hair on this area is specialized for signaling by being short in the center and grading gradually to longer hairs on the front edges. A special muscle under the skin can be used to make the hairs move any way the antelope wants it to. This hair can be suddenly raised and spread in radiating form into two great mirrors of dazzling white that catch the sun's rays and flash them far across the prairie.

An antelope I scared this past summer on the Colorado plains suddenly flashed this dazzling white signal and instantly flashes of similar signals from other antelope in the nearby brush also caught my eye. In a few seconds the entire herd had dashed out of sight over a rocky ridge. These antelope signals can be seen from many miles away over the plains. To help further in signaling of



danger, each animal gives out a peculiar musky smell that is carried on the wind and may reach and warn antelope that cannot see the flash of the white rump patch. Both friend and enemy messages may be flashed and scented in these two ways.

Antelope have several other smell glands that are probably useful in communication. The glands on the jaw are largest on the buck and grow biggest during the mating season in October, when they probably send forth a special smell message to the females and a warning to other males. The glands on the foot and hock of the antelope are probably useful in leaving scent messages on rocks and bushes among which the antelope passes. Another antelope coming later can tell from the smell whether a friend or stranger has passed, male or female, frightened by a man or afraid of nothing, and so on.

Young antelope are born in the spring time, and the mother may leave her baby alone for some time while she goes off to feed. But she has one trick that is very effective, and that is to kick up a cloud of dust all around where the little kid lies. This dust settles on the antelope kid and completely disguises his smell as well as her tracks. Smart mama! The mother calls her young one with a querulous, grunting bleat, and the kid answers with a shriller, softer bleat or squeak.

When it is not sure of what it is watching an antelope may give a short bark of curiosity. I came near a herd once at night, and was startled by a combination shrill whistle and snort of alarm that sent the whole band crashing away into the darkness.

Sometimes a mother uses a loud, grunting bleat to lure an enemy away from the neighborhood of her young. If

this does not work, she may pretend to be lame and limp away so she will be followed. If the stranger still goes near the baby, she may suddenly advance with bristling hair and blazing eyes. A blow from a sharp hoof can split a coyote's skull.

In the summer the antelope does and their young begin to gather into small bands. Later the bucks join them, and, at such times, the young ones have many merry games of king-of-the-castle, hide-and-seek, and follow-the-leader — bleating and squeaking with delight.

The larger bucks in the fall gather harems of does, and sometimes fight vicious battles. The two advance bristling and snorting, stamping the ground, and spar at each other with their sharp horns like swordsmen. Often the winner continues to chase and gore the loser until he is dead. A buck can give a loud "Kaaa!", a cry of triumph.

WILD SHEEP

Bighorn sheep can do astonishing feats of climbing among the rocky cliffs of the Western mountains. Far more intelligent than domesticated sheep, they cleverly avoid the dangers of both men and mountain lions by keeping guards to warn of danger. A warning snort sends the whole band rushing up to cliffs and peaks where the enemy cannot follow.

The baa of the mountain sheep is similar to that of the domesticated sheep (pages 32, 34), and means much the same; their actions at mating time are similar; but they have far better eyes, ears and noses for spotting peril, and when an old ewe throws up her head to watch across a mountain slope for danger the rest of the band is also instantly on guard.

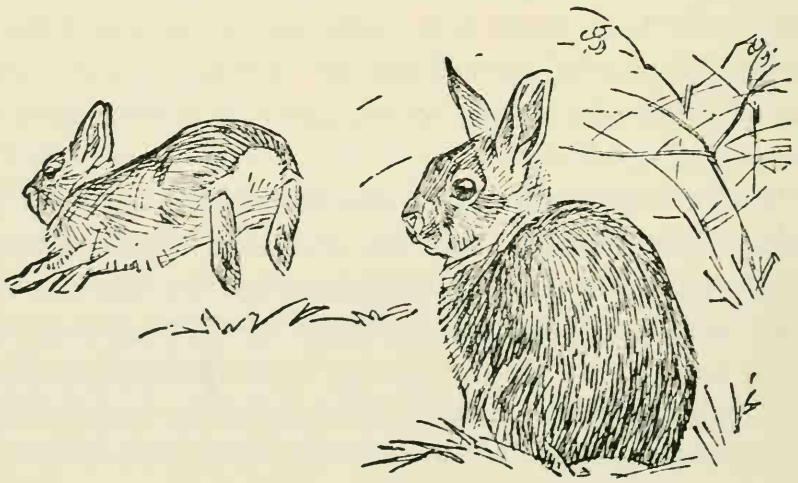
EARS

One difference between a rabbit and a hare is that rabbit babies are born pink and hairless, while the hare has furry babies. The rabbit also runs into cover or underground when chased, whereas the hare almost always depends on its long hind legs to get it away from danger. For these two reasons a jack rabbit is actually a hare.

The language of rabbits and hares is not very extensive, as most of them are not very social and they rarely cooperate with each other. The sounds made are similar to those of tame rabbits (page 35).

RABBITS

The cottontail is found almost everywhere in the United States and southern Canada, even in some parts of the deserts. Nearly everyone has seen the little, dodging streak of the cottontail as it rushes for home or shelter when surprised, its white tail standing up on end and flashing a signal of warning to all nearby rabbits.



At time of mating the male and female, buck and doe, may hop over each other in a kind of dance and rub noses and bodies together. The male often nuzzles and licks the female's fur.

A cottontail doe digs a shallow burrow under a log or rock or in a dense thicket and lines her nest with fur from her own body. The young rabbits soon after birth begin to squeak faintly for food. Later they are able to squeal when in danger, and sometimes the mother whines to her young. She protects them by kicking the enemy with her long hind feet.

On moonlight nights cottontails love to gather in a clearing in the woods and dance and play, sometimes jumping around and over each other as if they had gone crazy. But a sudden thumping from the hind feet of a sentinel sends every rabbit dashing for a hole or thicket.

Mother rabbits lay claim to definite territories to raise their young, and they fight all rivals. When two females fight, they advance on each other with grumbling noises, their ears flat down, then box with the front feet and try to bite. If a bite succeeds in getting a grip, each curves her body toward the other and kicks with her hind feet.

HARES

The two main kinds of jack rabbits are the blacktail of the more southern and dryer, lower country, and the whitetail of the more northern and mountainous country, though the ranges of both overlap in the West.

The whitetail, a larger and stockier hare, flashes its

white tail when surprised, both to confuse an enemy and to warn other jacks. In the far Southwest, the antelope jack rabbit, a variety of the blacktail, can move the white hairs on its rump exactly like the antelope (page 115), and so flash warning signals to its friends as it runs. It also seems to flash the dazzling whiteness directly into the face of a chasing enemy, and this may help to partially blind or befuddle a following coyote.

The jack rabbit at first freezes perfectly still when an enemy approaches, hoping the hunter will pass on without seeing it. If discovered, it dashes away in a zigzag at high speed, often making two or three particularly high jumps so it can look back to see what is chasing it.

In the mating season, which lasts, off and on, from early spring to midsummer, several males may gather about one female. They chase each other, spar and box, and sometimes come to close quarters to bite and kick. There is some angry grunting and growling in such combats. A young jack rabbit, when it is attacked, may both spit and box.

The snowshoe rabbit or varying hare of the Northeast and the high mountains of the West is really a hare, and, like all hares, depends mainly on speed to escape its enemies. It also has wide flat feet, which help it run over the surface of soft snow.

The males have many boxing matches during the spring and summer mating seasons, and sometimes they give snorting grunts of anger. The female usually runs away from the male and leads him a merry chase in and out of the bushes and trees. Most of this hare's methods of communication are similar to those described for jack rabbits.

TAILS: RODENTS

Rodents have four large front teeth instead of the overlapping eight of rabbits. They are the most numerous of all mammals in kinds and number, and form the staff of life of many birds and carnivores. Because of the very many kinds of rodents, I am going to discuss the languages of only a few of the more well-known species. Many species of rodents are still very little known, and much could be found out about them by careful study.

NATIVE MICE AND RATS

The most typical native mouse and the most successful is the white-footed mouse, which is found nearly everywhere on the American continent, from low desert to high mountain peak. Like that of most mice, its chief defense against a hostile world is to breed as many children as possible.

One of the most interesting of all my wildlife experiences was to sit very quietly in an old, abandoned cabin and watch the white-footed mice make merry among the decaying quilts and old newspapers. These mice, as I became more acquainted with them, seemed most astonishingly human. Both old and young played together like children, one sometimes sneaking up on another and pinching its tail, then both chasing each other round and round an old oilcan at top speed, then reversing and chasing the other way.

Every few minutes a mouse would stop its play or its searching for food, to clean itself. It did this seriously, by first running its tail through its mouth, then reaching

down and grooming all the fur it could reach. It would even comb and slick down the fur on top of its head and neck by moistening its front paws and then running them over its "hair," like a man standing before a mirror. Last, with a pleased expression, it would look itself all over and then run back to play.

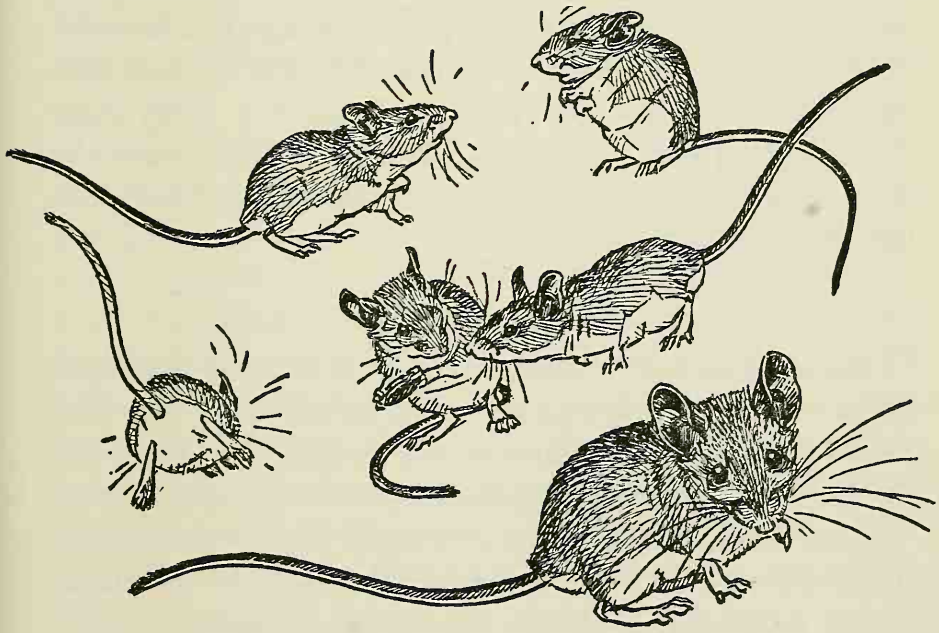
These mice seemed to communicate whenever two of them met. I suspect some of this language lay in the expression of their large, liquid brown eyes. Sometimes they would wiggle noses together, or sniff each other all over. When a mother met one of her young ones, you could tell it was hers because she would stop to lick it. Once in a while two mice would rear on their hind feet and playfully box with their forefeet. But once, when two males who did not like each other met, they squeaked angrily, rose and boxed vigorously, then clinched and rolled over and over biting at each other. The smaller one finally tore himself loose from the other's grip to run away, squeaking with loud protest. The winner of this particular fight seemed to be the boss of the cabin, for I noticed that usually whenever he came up on stiff legs and with bristling fur to another male, the other ran.

When I moved a little bit, a mouse that saw me immediately thumped the floor rapidly with its forelegs, and I at once heard, all about me, the scampering of little feet running for cover. However, I held completely still. Soon I saw a tiny nose peek out from a hole in the wall; then there followed a squeak of reassurance, and several mice came out to play.

White-footed mice, as well as most other mice, develop definite territories that they defend. Most white-footed mothers raise their young alone, without the help of the

father, but in one genus this is not true and the father becomes a true provider and helpmate. If a strange mouse comes near the territory of the family, he is warned away with angry squeaks and with thumpings of the front feet. If the hair rises on the back, and the ears lie back, this is a warning signal of imminent attack.

The many different species of white-footed mice show a very wide variety of behavior. Some are very friendly and make easy pets (most of the Western species), while others (especially some Eastern mice) are very nervous and short-tempered.



The female raises several litters a year, usually in some hidden place in a bush or under a rock or in an abandoned building. The mother answers her babies' high squeaks of hunger with reassuring deeper squeaks of her own. She hunts for food mainly in the early evening and very early

morning, sleeping with and nursing her young ones the rest of the day. Though seeds and plant foods of various kinds are mostly sought, she often creeps up on insects like a little cat and suddenly pounces. Even other smaller mice are sometimes caught and eaten. As she hunts, she is constantly on guard against danger, her nose wrinkling against every breeze, her whiskers quivering and her ears and eyes alert. At any dangerous sight, sound or smell she runs with a squeak of warning for a hole.

Occasionally a white-footed mouse is heard to give a shrill, buzzing sound that may be heard forty to fifty feet away. This is probably the mating song of the male. When he finds a female he chases her, but he may suddenly seem to become frightened and run away from her. So then she chases him. The two often smell and sniff each other all over with great excitement. Field mice are very similar.

Mention should be made of the howl of the grasshopper mouse, a stout little mouse with a naked thick tail. This mouse has apparently turned into a carnivore, for it lies in wait for and pounces upon other mice and large insects with all the fierce savagery of a tiger. Its faint, shrill and long whistle has been likened to the howl of a wolf by many naturalists, because the mouse gives this "howl" whenever it starts out on an evening or early morning hunt. One purpose of the howl may be to warn other grasshopper mice to stay out of the howler's territory.

When following down a hot trail through the thick grass jungle, the grasshopper mouse may give a sharp, squeaking bark of excitement. Possibly this sound is used,

like the roar of a tiger, to paralyze the will to resist of the mouse who is about to be attacked.

The wood rat is a far more likable and beautiful animal than the Norway rat, who so infests our cities. I have lain out in the woods and watched a wood rat come out of its big pile of sticks to search for food, its whiskers quivering in every direction and its nose wrinkling to catch the scents. The large, brown and liquid eyes appear very alert and intelligent. The body is pleasantly clothed in clean brown fur above, white and whitish below; the tail also is covered with hair, far different from the ugly brown and dirty common rat with its cunning and savage small eyes.

Wood rats are not very sociable animals, though individuals vary in this regard. Each individual either occupies an old stick house or builds his own new one, and tries to find a place that is best protected from the rain and from enemies. The best houses are naturally occupied by the biggest and strongest rats, who drive away all others of their kind. As the rat sits in his house and hears another rat approaching, his immediate warning signal is to thump his tail vigorously on the ground. If this fails to drive the intruder away, he gives an angry squeak and rushes out to do battle. Usually the strange rat makes a hasty retreat.

The squeak of the rat conveys different emotions, such as anger, or fear, or the calling for a mate. A wood rat I caught in my gloved hands once squeaked very fast and loud at first, but this gradually became softer.

The wood rat gives many signals by its movements. When the ears are held back and together and spread to

catch sounds from the sides, this means the rat is listening very carefully for danger. As soon as it senses an enemy, it loudly rattles its tail in warning and dives into a hole, where it rattles again. If the large dark eyes bulge outward, this means the rat is feeling great fear. If the head is thrown up quickly as the animal is feeding, this expresses alarm. When the ears flare up and outward and are rigidly held like cups, this means the rat is curious about some noise it hears and possibly a little alarmed. Ears completely flattened back and whiskers quivering mean anger toward another rat.

The wood rat's house also talks a language to other rats and to us. If the entranceways at the base of the stick pile are well-cleared and show fresh droppings nearby, then we know there is a rat using the house. If it is a low and poorly built house, then it is probably being used by a young and lazy rat. If the owner doesn't get busy and build it right, he is liable either to be drowned out or caught by a fox or an owl. When a house is well built, in a good location on a hillside and with a steep roof, it is probably occupied by a wise old rat. If a rat is seen taking soft nesting material into a house, then this is a female preparing a nest for her babies.

Rats leave their smells about their homes and in nearby places where they stop to wet, leave droppings or gnaw on twigs. A strange rat visits all of these places, sniffing deeply in order to determine what kind of rat left the signs. In the winter and early spring the males are looking for mates and they approach these smell posts with great excitement, their whiskers quivering.

When two hostile males approach each other, they rattle their tails and stick out their hair to try to look as

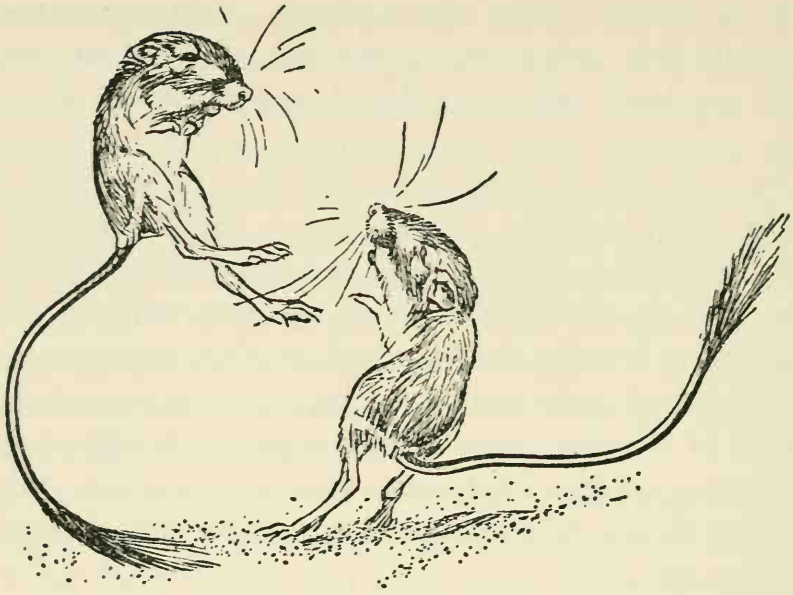
large as possible. They squeal angrily, chatter their teeth, and will fight unless one is bluffed away by the other. Tails are held high until the bluffed rat drops his and runs.

You can tell a male at mating time by the way the heavy cheek muscles give its face a puffy appearance. Also the belly is often stained brown by a smelly secretion. This stuff is rubbed off on rocks or twigs to leave messages to females and warnings to other males. A large and powerful male may have his house surrounded by houses of females, since he drives away all other males from the area near his house. After the female is mated, she soon drives the male out of her house with angry tail rattlings and bites.

Low chirps have been heard from wood rats during the mating season. Certain wood rats not only rattle their tails when alarmed, but also thump the ground with their hind feet.

Wood rats are also called "pack rats" and "trade rats," because of their habit of running away with any bright and shiny objects they may find. I once watched a wood rat which was carrying a stick immediately drop the stick when it saw a bright sixpenny nail. Its whiskers quivered with excitement and its eyes were shining with avid interest as it picked up the nail and ran away to store it with other bright and shiny things in its home.

The kangaroo rats of our deserts and drier country are among the most interesting of all American animals. Their powerful hind legs, long graceful and tufted tails, and their cleanly habits make them distinctive. The males fight by leaping high in the air and kicking at each other



with those strong hind legs until one is knocked unconscious or severely wounded.

Kangaroo rats vary greatly in size among the many American species, and also in character. Some are gentle, confiding little creatures who make excellent pets, while others are savage and untamable. In the wild, one species of large kangaroo rat may completely dominate a smaller species, which it chases away from the best food and kills if it captures it.

Kangaroo rats live in holes under bushes and come out only on dark nights to feed and fight and play. In the desert darkness I have heard the low chuckling noises of food-hunting rats, heard the high-pitched squeak of anger when two fighting males meet, and listened to the loud thump of warning given by their hind feet when they feel danger is near. But the rats themselves I could see only rarely as dim and shadowy elves in the starlight.

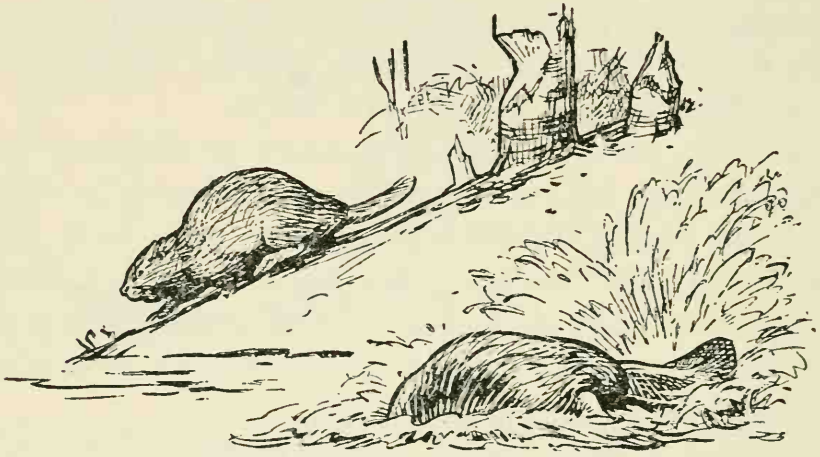
The beaver, though the most intelligent and highly social of all rodents, is by no means as clever and wonderful as some popular writers have made it out to be. Beavers do not always know how to fell trees in the best direction, and the dams they build, while showing great industry and construction ability, are not always made in the best places or with the best design.

Beavers generally mate in January or February and may mate for life, though some males appear to break this rule. Males, seeking a mate, leave scent from their castoreum gland in mud pies along the banks of creeks or ponds, and also search for and smell excitedly the scent left by females. Males bristle and chatter their teeth when they find the scent of another male.

The kits or baby beavers are usually born in May, and soon grow large enough to start helping their parents with their work. The summer and fall is a very busy time spent in building and strengthening houses and dams, storing food for the winter by hauling branches under water and anchoring them with mud, and extending their canals to new feeding places.

I watched a beaver come out of the water once and stand erect for some time testing the air with its nose and turning its ears from side to side. Satisfied that no one was near, it waddled to a small cottonwood tree up on the bank where it had been working before, placed itself before the tree with legs spread wide and the thick, flat tail forming one arm of a tripod. Then it seized the tree with its front paws and began efficiently to cut out large chips with its strong front teeth. It had hardly started, how-

ever, before another beaver saw a slight movement that I had made with my hand, and hit the beaver pond a terrific slap with its tail. Instantly the beaver on land turned and darted for the water, into which it dived and disappeared.



As a beaver gives warning of danger, there are actually two sounds, first the loud slap of the tail on the water, then a hollow plunging sound as it dives. The second sound confirms the first. Beavers also have several other noises of communication, including a hiss of menace when ready to fight, a chattering of the teeth in anger, a less bellicose chattering noise when they meet in friendship and nibble at each other's cheeks in greeting, a querulous "Chrrrr?" when they are annoyed or questioning, a childlike wail from the young when they are hungry, and a deep hoarse groan from the male when he is calling the female at mating time. Rather rarely beavers snarl, either in play fighting or the real thing. Soft churring noises, mumbles and whines have been heard from in-

side a beaver house and these are probably social noises or requests for more room and food.

Beavers are very cooperative in building dams, stick houses and canals, so that the feeling comes to many who watch them that an old and experienced beaver carefully plans and directs all their work. But the actual communication between them that tells each what to do has not been observed. I have watched beavers rub noses, softly bite cheeks and mutter together, so some message about work could have passed between them. I am inclined to believe, however, that the old leader mainly shows the others what to do by example and they copy him. Possibly he comes around now and then to check on their work and criticize or encourage largely by his attitude. Animals are extraordinarily keen about recognizing emotional meanings from the tiny movements of other animals or the expression in the eyes.

SQUIRREL FAMILY

Squirrels and chipmunks do a good deal of talking with their tails, constantly jerking them about by nervous action of the muscles at the base of the spine. When a squirrel is in real fear, it lowers its tail and runs for dear life. When it sees a strange creature or man whom it wants to scold, the tail begins to jerk about furiously while it calls the other creature names in a loud voice.

When one male squirrel is advancing on another male to attack him, he spreads the hairs on his tail to make it look as large as possible and holds it high and curved over his back. If the tail starts to lower at all, this means one squirrel is becoming afraid of the other and getting ready to run.

The first time I heard the loud "Quack-quack!" of warning given by a gray squirrel I thought the noise came from some big animal like an otter, and rushed down to the Eel River to look. Soon I saw the gray squirrel in a tree, jerking its large and graceful tail about, and heard the startling noise again. The signal was followed by complete silence, as every gray squirrel in the neighborhood had found a good hiding place and was staying there.

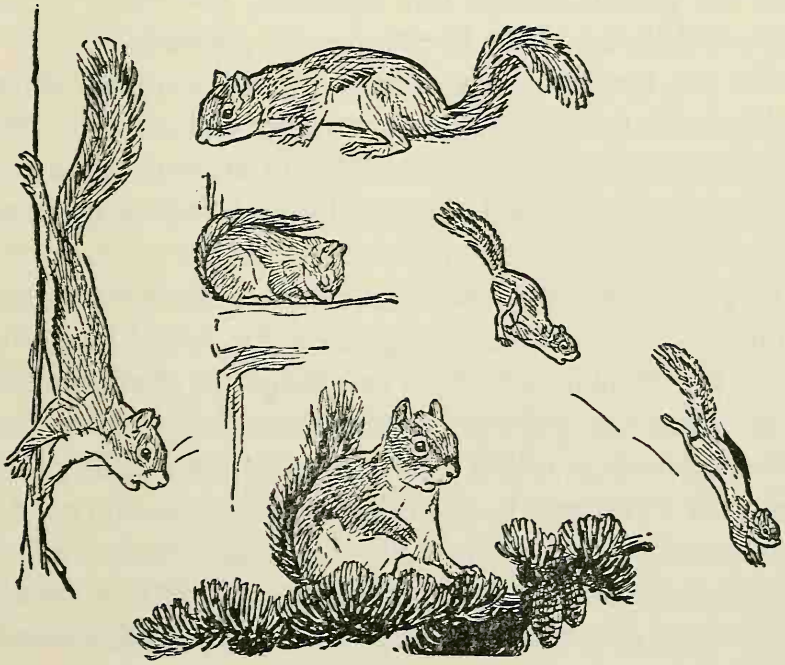
Other sounds given by the gray squirrel are a peculiarly defiant "N-grrrr n-grrr n-grrrr!" sometimes when the squirrel feels it is successfully escaping or hiding from an enemy; a low purr of pleasure, when one squirrel is being scratched or stroked by another; also a "Maek-maek!" with or before the cry of warning, expressing intense excitement, fear and defiance; a scolding "Kwa-kwa-kwa!" used on jays or enemy squirrels to drive them away; and a nasal, throaty, buzzing series of sharp grunts, which is sometimes heard to come from two or more localities at once, and usually expresses triumph. When this last sound is soft and low it is like a purr and expresses love between mates. If it becomes very violent and loud, it is an angry rebuke and may be a warning before one male attacks another. Another similar warning is a chatter of the teeth that sounds like a muffled clicking of rocks in a box.

The barking song of the squirrel is heard sometimes in the early morning and may be either the call for a mate or simply an expression of delight in being alive. It may be first a series of sharp, rhythmical cries like a cat crying, then a rolling string of "Qua!"s that gradually quickens into a harsh, rattling drumbeat. The song varies, however. When it is a real love song, either male or female

will put into the call a longing and tenderness, so soft sometimes as to sound like the whimper of a baby mouse or the hiss of trees rubbing together in the wind. The squirrel, as it sings, stands with body tense, tail quivering and throat throbbing.

The red squirrel is a creature of the pine forests, unlike the gray squirrel, who prefers the hardwood forests. The constant chattering, chirring, coughing, barking and scolding of the red squirrel indicates his high spirits and mischievous nature. The tail is a blur of motion, expressing one minute curiosity, another moment anger, a third time mocking triumph. The forefeet may be stamped in anger or as an alarm signal.

Red squirrels sometimes combine all their various cries



— the coughing challenge, the spitting hiss of anger, the chirr-chirr cry of comradeship, the growls of rage, the snick-snick-snicker scolding cry — into one song, that becomes either a song of love or simply of good spirits. Red squirrels commonly mate for life; there is often real affection shown between the mates as they nuzzle each other and chirr softly.

Both red and gray squirrels have glands in their rear ends that give out a clear yellow fluid or musk that is dropped here and there on the trunks of trees. These scent posts or signal boxes are smelled carefully by other squirrels and pass along useful messages.

There are so many ground squirrels that it is impossible here to give more than a brief mention of a few outstanding species. All ground squirrels have thinner tails than the graceful-tailed tree squirrels, and when in trees they react to danger by running to the ground.

On our ranch the California ground squirrels whistle shrilly whenever they see us coming and dart for their holes. Some of the more cheeky stay at their burrow entrances, jerking their tails rapidly, and calling us names with each sharp whistle.

In the central Rockies the Columbian ground squirrel gathers food in the fields whenever the sun shines, chattering in low chirps with its neighbors. In the mountains of the West the golden-mantled ground squirrel is common on the edges of the pine forests, where it is often mistaken for a chipmunk, but it has no stripes on its head. It occasionally gives a single alarm chirp that sends its friends into their holes. "Tachack-pr'r'r'r!" is another alarm note given, after which the tail is jerked violently.

When angry or impatient with other squirrels, it grunts, buzzes and chirps at them. Sometimes a soft, tick-tick noise, with nervous jerks of the tail, expresses worry or dislike.

The Antelope ground squirrel of the Southwest deserts has a white-marked tail that it flattens over its back and twitches quickly or even vibrates with great speed to flash a message of alarm. Sometimes it gives a shrill, rapid chittering cry when alarmed. The rock squirrel of the Southwestern mountains spreads the alarm with a short, sharp whistle. The striped ground squirrel of the Great Plains also has a short, sharp whistle for spreading alarm, besides which it gives a long-drawn-out and quavering whistle of defiance when it escapes to its hole, or an angry snarling when trapped or fighting with its kind. It snarls also when attacking a mouse.

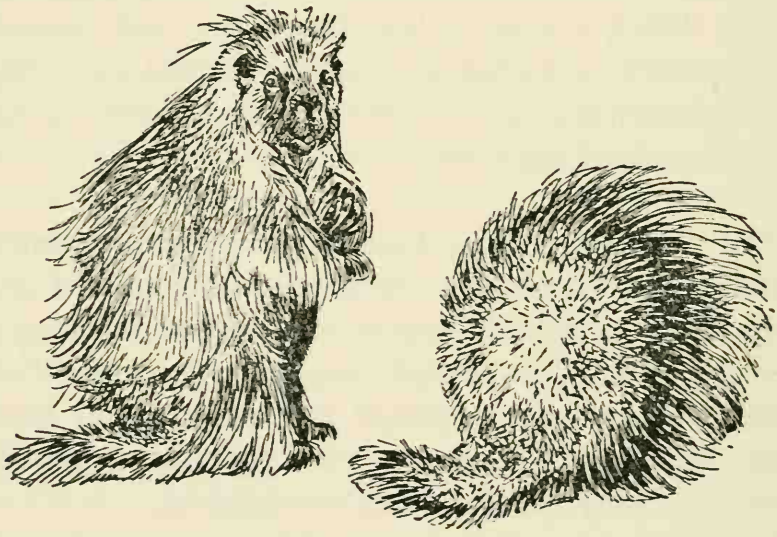
The woodchuck is a kind of large ground squirrel found mainly in the East. The yellow-haired and hoary marmots in the Western mountains are close relatives. All three animals are also called "whistlers," because of their loud whistles of alarm. Small red musk glands on the inner sides of the front legs of the woodchuck are used to leave smell messages for other woodchucks.

PORCUPINES

All the porcupines I have approached have gone through the same warning ritual. First the porcupine rattles his tail at me, then he begins to bring all his quills erect. Third, he humps up the middle of his back, pulls his nose and head back and raises his tail in a position for immediate action. All this means: "Look out! don't get

too close!" When I touch the porcupine with a stick, he lashes suddenly at the stick with his tail, trying to stick quills in it, and at the same time chatters his teeth in anger.

When I try to circle a porcupine, it turns its body with me, moving the hind quarters with quick little hops of its hind legs so that the dangerous tail will always be towards me. This technique is very effective with dogs, and the attacking dog usually comes yelping home with his mouth, lips and neck full of quills, each of which continues to eat its way into the flesh.



During the mating season male porcupines bristle their quills at each other and chatter their teeth in rage before attacking. All porcupines at this time become very loud-mouthed — grunting, whining, chattering, even barking and mewing at each other, the hankering notes being between two mates, the angry ones between two males. Very ardent males may moan.

BATS AND INSECTIVORES

These orders are lumped together here because they are small and because they are not noted for many ways of communication.

BATS

Much of the communication of bats is lost to us because their squeaks, for the most part, are so high-pitched that we cannot hear them. Most of them do have squeaks of alarm that we can hear, however, and in a cave where there are thousands of bats my ears have been almost deafened by these shrill sounds. The extraordinarily quick movements of bats when flying also must have value to the animal in communicating, telling other bats of the location of their flying insect food and also of the direction of danger.

INSECTIVORES (MOLES AND SHREWS)

These very primitive animals lead lives that are largely instinctive. The shrew, for example, travels at high speed over the ground in a zigzag fashion, following its own smell trail or that of other shrews, and reacts to the smell of a mouse or insect by whirling about until it can make contact and kill. But, put in a strange position, it appears helpless and unable to know what to do.

The underground life of moles is yet to be really explored by naturalists, and little is known about their language. I have kept shrews in captivity and listened to their high-pitched twittering, a sound that becomes very rapid and bloodthirsty when they start to fight. Females make a low-pitched, rapid, chattering noise when nuz-

zling a male in a sign of love. A very shrill chatter or shriek is given by a trapped shrew. A very soft squeaking sound is heard when a shrew is contented and happy.

Shrews give out a strong smell from glands at the rear of the body, and leave this wherever they go, not only as a message to other shrews, but to show themselves where it is safe to travel.

CHAPTER 5

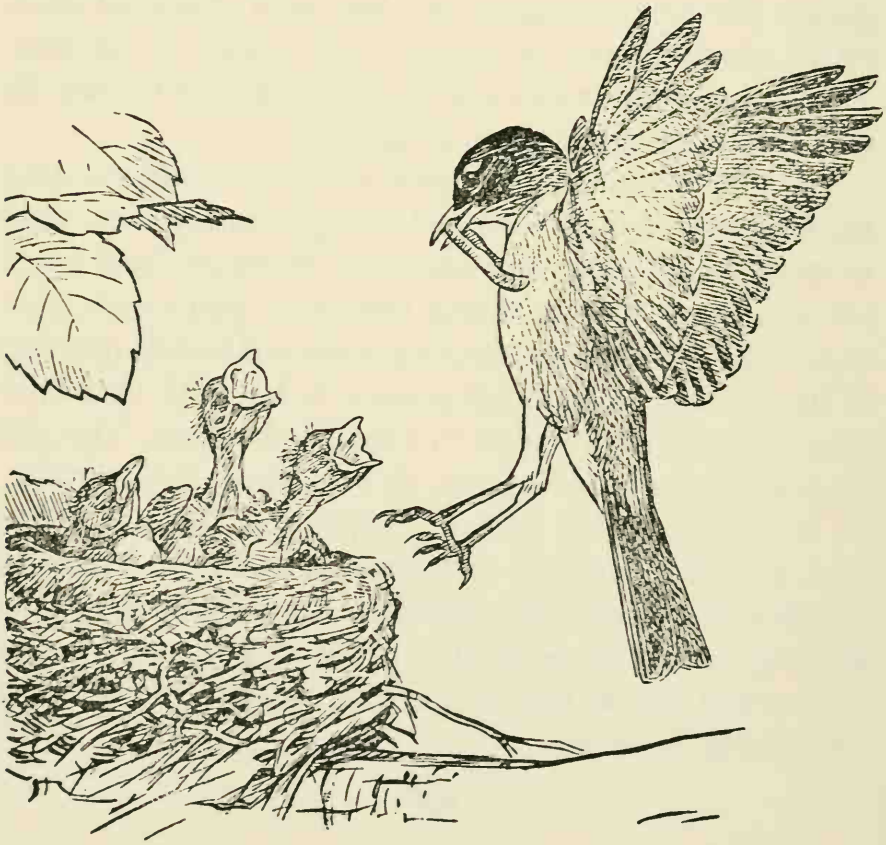
Wild Birds

The language of birds, with the exception of a few highly social and intelligent kinds like the crows and the parrots, is generally largely instinctive and is simpler than that of mammals. For this reason, in this chapter, I am going to give certain basic information about bird languages plus some examples of a few birds of special interest or representative of certain bird orders or families. This will give the reader sufficient information to start his own studies of specific bird languages.

As with mammals, the main secret of understanding the language of birds is to feel enough kinship with them to catch their feelings and emotions. When you hear a gull scream, try to look at things through a gull's eyes, eyes backed by a brain capable of emotion and a swift reaction to happenings immediately around it, but with very little reasoning power, foresight or capacity for ideas. The gull screams because it is hungry, or frightened, or frustrated, or angry at another gull, or maybe just because it has seen something curious and wants to draw the attention of other gulls to the curious object. Look where the gull is looking, and try to see what it sees; then, perhaps, you can understand the emotion it is conveying with its voice and its motions in the air.

There are usually seven big events in the life of a bird that influence what it is going to say and how it will say it, and most birds react in the same or very similar ways to these events.

First, there is the breaking open of the eggshell and the beginning of hunger. Instinctively, the young bird opens its mouth and into this mouth the mother or father puts some food that has been swallowed, partly digested, and then thrown up again (regurgitated). The taste of this food is good to the young bird and it opens its beak and gives the hunger cry of its species, commonly a shrill "Tseep-tseep-tseep!" It learns gradually not to give this hunger cry all the time, but only when it sees the parent bird approaching.



The second big event in the life of a bird is learning to fly. Actually the young bird instinctively knows how to fly, but at first it is afraid. The parents try to encourage it by calling to it gently as they flutter nearby in the air, by dangling food near enough for it to see but not to reach without flying, and even by pushing the young bird until it falls out of the nest and has to fly. Their cries usually become rather shrill and impatient as the parent birds get tired of waiting for the young one to make up its mind. "Come on, come on!" they seem to say. "Quit fooling around and fly! You are a big boy now!"

At last the young bird, peeping its protest and fear, is bullied or urged into making the first desperate attempt, which almost immediately shows him he can really use his wings. Of course his flight is very clumsy at first, and he may fall to the ground, but practice makes him perfect.

The third event, which may be experienced before he learns to fly and help him with that operation, but more often is experienced afterwards, is that of being chased or in some way attacked or frightened by an enemy. Most birds instinctively know what to do when this happens. They run or fly away, yelling for help. But some of the most highly developed birds, such as the crow and jay, have to be taught by their parents to try to escape from an enemy — for instance, a cat. In all cases, whether by instinct or as a learned response, the young bird gives the characteristic fear and alarm cry of his species. He clearly expresses this emotion of fear; and all others of his kind who hear it, as well as many other animals and birds, take warning from his cry and are alert to danger. He may

also warn of danger by the flashing of some of his feathers as he flies.

The fourth event is that of hunting for food. Almost as soon as a young bird begins to peck at things he is beginning to hunt for food, but of course his real hunting comes when he is old enough and strong enough to take care of himself alone. His hunting language depends on whether his kind of bird hunts alone or in flocks. Most carnivorous birds hunt alone and give a hunting cry to claim a certain territory. Even birds that hunt only insects and grain have a cry that may claim a territory. Other, more social birds call other birds of the flock to come to eat with them. For example, the light "Tsee-tsee!" cries of a swarm of little bush tits moving through the bushes become more excited when some of them find good insect hunting. They are calling other bush tits to the feast.

The fifth and greatest event in the life of a bird is mating. The first time birds mate they do so almost entirely from instinct. Later, the more intelligent birds may add variations gained from experience. Though the mating patterns of birds are often quite different in particulars, there are certain basic things most of them have in common. The male usually acts as the aggressor and the showoff, having more brilliant plumage than the female. The female acts coy, shy and retiring, but usually definitely interested.

The male, among most birds, must find a place where a nest can be placed in a protected spot. Then, by voice mainly and by display of feathers, but occasionally by physical combat, he must win a territory for himself and his mate. In the case of a songbird, he flies to a high spot

Drumming

and sings at the top of his lungs to warn all other birds away except his mate. Other kinds of male birds do things like drumming (grouse), gobbling (turkeys), screaming (gulls, jays) — but, whatever he does, a male bird lays claim to a definite territory. The female comes and looks over both the male and the territory and nest location. The male struts, preens, sings, gobbles, or does anything he can that will attract her attention and make her think favorably of him. When she accepts him, she usually touches bills with him and then crouches in front of him. Soon the female is busy gathering materials for their nest,

sometimes very simple (only a few stones scraped away in the case of gulls), or sometimes very elaborate (a delicately woven hanging nest for the bush tits). The spring is thus a period of much activity and noisemaking.

The sixth great event is the laying of the eggs and the setting by the female and sometimes by the male too. When the eggs are laid, the female lets it be known by her excitement and the cries she gives. The male also becomes excited and makes more song or noise than usual.

The seventh event in the life of a bird is the feeding and protection of its young. Far more birds than mammals pair for life and both parents usually take an active part in the rearing of the young. The mother and father answer the hungry calls of the young birds by bringing food to their mouths or regurgitating partly digested food from their own crops. They are at work constantly bringing this food, and a conversation goes on between mother and father at this time telling of food brought and possibly where more is to be found. Other birds, such as the grouse and quail, take their children on food-hunting trips at an early date and help them find food.

At all times the parents are on guard against enemies. The alarm cry from the mother usually brings the father flying home to dive with angry cries at an intruding cat. The terrible claws of a mother horned owl have missed my head by a fraction of an inch when she dived at me for coming too near her nestlings. Other mothers or fathers, like the mother killdeer described on page 6, are adept at luring an enemy away from the nesting site by pretending to be wounded.

SEA BIRDS

Probably the most commonly seen of all sea birds is the gull. Gulls are sharp-eyed scavengers of the seacoasts and some inland lakes. As they fly, they keep watching each other, and when one sees another gull drop down to the water or on the shore to grab something to eat, it too flies in that direction to take part in the feast.

The scream of the gull is used to express many emotions. When a flock of them screams while diving down on garbage thrown from a ship at sea, the scream is one of excitement and of the desires for ownership, each gull hoping it can get the most choice bits. A more angry and alarmed scream is heard when the gull's eggs or young are threatened, and the bird may even rush at a man, striking with wings and bill. Then there is the scream of the male bird to its mate and her answer back, a long, keening cry.

Fighting gulls spread their wings about halfway and hop towards each other with short screams of rage. The blows of the beak are quite savage, till the loser, with a scream of rage and frustration, suddenly turns away and flies, leaving the victor to strut about on the rock and impress the nearest female. The loser in the fight often stops to preen and clean himself thoroughly. This is done by many birds when defeated in battle, and seems somehow to soothe injured nerves.

I have watched gulls cleverly steal food from other birds by one gull distracting a bird's attention, while another swoops in and grabs the food. Sometimes the loud scream of a gull makes another bird drop food it is carrying, which is quickly swooped on by the pirate gull.

SHORE BIRDS

Of all the shore birds the commonest and probably the most successful is the killdeer, a black-and-white-marked bird found in grasslands, swamps, and shores of both ocean and fresh water. You have already read how the killdeer mother acts when her young are threatened (page 6).

I have heard the killdeer in the evening in flocks above me in the gloom, darting erratically through the air, sometimes almost down to the ground, then zooming upward, and always uttering an excited "Dee dee dee dee kee-dee!" These birds seem to be taking part in some kind of interesting game — possibly tag or hide-and-seek — in the sky, their joyful voices seeming to shout: "You're it!" "Now *you're* it!"

On the golf courses and in freshly-plowed fields the constant "Dee-dee-dee!" of the killdeer may be heard early in the morning or in the evening, as the birds cry back and forth to each other while hunting insects and worms. It is a social cry and sometimes a call to better food.

In the early spring mating time, the male dives and spirals and swoops recklessly, calling constantly with wild longing. On the ground, before the female, he dances, pirouettes and bows, and ducks up and down until you'd think he would be dizzy! But she crouches before him, calls back ardently, and watches admiringly.

On the ocean and bay shores I have watched little flocks of killdeer and other shore birds gather to probe in the sand for sand fleas, or sand crabs and worms, moving

in little spurts and then stopping to dig furiously. At my approach, they give a shrill cry of alarm and fly as a unit down the beach.

Some friends and I saw a long-billed curlew once when we were walking over the alkali flats and marshes near the border of Great Salt Lake in Utah. We came upon a large bird with a great curved bill. Its reddish-brown and spotted coloring so perfectly merged with the russet-colored short grass of the plain that we would not have seen it if it had not suddenly moved its bill and head. At our near approach, it suddenly flung itself forward over the ground, running at first, with wings flapping, and then leaped into the air and rushed skyward, uttering piercing, trilling cries that were repeated over and over.

When we came near where it had been, we saw three large, pale-buffy eggs with dark brown spots in a little depression in the grass. The cries of the long-billed curlew now became even more piercing, and you could feel the strong emotion of worry and fear in the voice. The bird circled near us on the ground and began to drag its wing, crying with most pitiful tones. At this sound, the male bird appeared from the east and swept low over us, also uttering the high-pitched cry, rocking its wings and fluttering as if about to fall to the ground. Both birds worked in perfect teamwork to draw us away from the nest and eggs, and, when we were safely away from their sacred place, we heard the emotion in the shrill voices turn to relief and reassurance. At last, crying with a triumphant note, they swept away from us and back to their home.

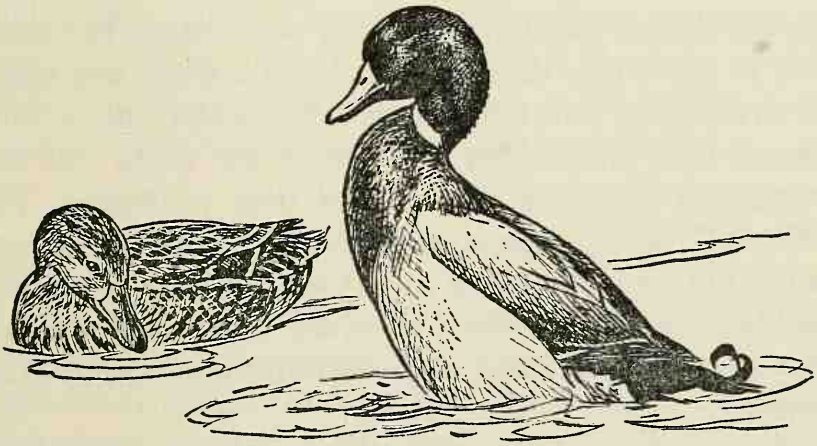
These birds are among the great migrators, who travel far through the skyways, following the spring as it creeps its green northward way toward the pole, or going southward in the fall in search of summer again. They are all of them flock birds, following the law of the flock because by this law they may live. Usually an old female is the leader, and on her wisdom the other birds depend as they fly. If she is wise about hunters and guns, foxes and coyotes and mink, she will lead them safely through all the dangers of their great migration.

High in the sky the wise old leader watches for a lake where it is safe to spend the night. Suddenly she gives a cry and points her head and body downward. All the birds of the flock have their eyes on her, so they too bend downward almost as one bird and take the long glide for the waters below. Perhaps she sees the glint of sun on metal, half-hidden in the weeds. She gives a different cry, a cry of warning, and the flock rises again in the sky, seeking safer water.

The leader, when a safe lake is found, gives the food-gathering cry, and the flock follows her over the water to the lush seeds of the cattail or the wild and tame grain (if she is a goose), or to good places to dabble on the bottom (if a plant-feeding duck). As they feed, the old leader and probably one or two others are always on the watch for danger. You see them stop every minute or so to stretch their necks about and look everywhere. One sees the red of a fox's fur in the rushes on the lake's side, and again comes a cry of warning, but a different sounding cry that

means "Fox!" in its tone. This time the flock does not fly, but paddles out into deeper water where the fox cannot go.

Each species has different ways of mating, but almost always the males try to display their colors and attract the females. I have watched a male mallard duck preen itself before the female, turning to and fro in the water in front of her so the sun will catch the bright green of his neck feathers and flash and dazzle her. It seems as if she turns from him, but usually he herds her back where she must watch him, sometimes flapping his wings and craning his neck far above the water to show her how beautiful he is. All the time he quacks softly to her. When she begins to answer in like tone, then he knows he has made a conquest.



When the young birds break loose from the eggshells, they follow the adults like shadows, copying all they do, but instinctively scattering to hide in the rushes when the alarm cry is given.

HERONS AND BITTERNS

These birds are solitary wanderers most of the year except during the nesting season, when many species gather in colonies for mutual gossip and protection. Of this group the great blue heron is probably most likely to be seen by most people. In the spring rookeries where I have watched them nesting in the tops of large oak trees, I could hear the constant "Kronk kronk!" of gossip between the adult birds, and the shriller piping of the nestlings calling for food. The great stick nests in the tops of the trees were carefully guarded by the parents, who brought regurgitated food to stick down the craning throats and wide-open bills of the young.

In the mornings, the parents usually flew away on a hunt to distant marshes where they would stand like sentinels in the water, their powerful bills cocked and ready to strike. Any fish, crayfish, or other water animal who passed near was swiftly grabbed in the sharp bill and sometimes tossed in the air and then swallowed. The "Kronk!" cry is sometimes given on a note of triumph when the heron is lucky at catching things, sometimes with a deep note of alarm when the bird sees a man approaching. Then it rises clumsily into the air on its great wings.

At mating time most of the heron and bittern males develop special feathers, more beautiful than the rest, on their necks and heads. These are spread out proudly and waved to and fro in front of the female to charm her. The males sometimes do a kind of awkward dance as they show off these feathers, and the females curve their necks, turn their heads and look coy.

LOONS AND GREBES

The incredibly fast diving of loons and grebes is part of their language, for they watch each other in the lakes and rivers, and, when one dives suddenly, the others dive too, because they sense the danger signal. Both grebes and loons are noted for their often fantastic mating tactics.

The Holboell's grebe begins his mating song with quickly repeated, plaintive and vibrating short wails: "Ah-ooo, ah-ooo, ah-ooo — ah-ah-ah-ah!" Sometimes the song ends with a machine-gun-like chattering trill, like "Whaa, whaaa, whaaa, whaaa, chitter-r-rr-r-r!" It also has a hoarse and prolonged nasal "Gronck!" — something like the bray of a donkey — and a raucous "Cawack, wawwaacck!" that is very loud. The male, while giving all these sounds and sometimes others in an amazing mixture, often whirls around in the water at high speed and shows off its head plumes to the female. If attracted, she calls back and swims out to meet him.

HUMMINGBIRDS

Around their nesting places hummingbirds are often savage tyrants towards any bird or animal who comes too near, diving directly at the object of their wrath and using their sharp bill with good effect. At the same time they give shrill, angry and buzzing war cries.

Most hummingbirds do not sing, but an exception is the male Anna's hummingbird, who lives near us, and often sits high on a bush to send forth a series of thin and cheerful squeaks. When a male Anna's hummingbird goes courting, we see concentrated emotion in action.

Down from a high perch he comes, zooming like a bullet, making a vast U in the empty air and giving an explosive whistle with his wings at the bottom of the U. Back and forth, up and down, on the U he may swing like a pendulum, flashing his brilliant crimson neck feathers in the sunlight. The female quietly sits on a nearby branch and watches him. If she flies off, he goes after her like a shot and the two may gyrate high in the sky in a kind of mating dance.

The male hummers of different species have different shapes to their zooms. For example, the Allen's hummingbird makes a great V when he dives. But in all cases this zooming dive is both a mating song and a warning to all other males to stay away from this territory. Two males often dart at each other with shrill, angry squeaks, striking with their sharp bills. Often they clinch in mid-air and then flutter to the ground, still fighting, but soon one of them has had enough and he flies away to other territory.

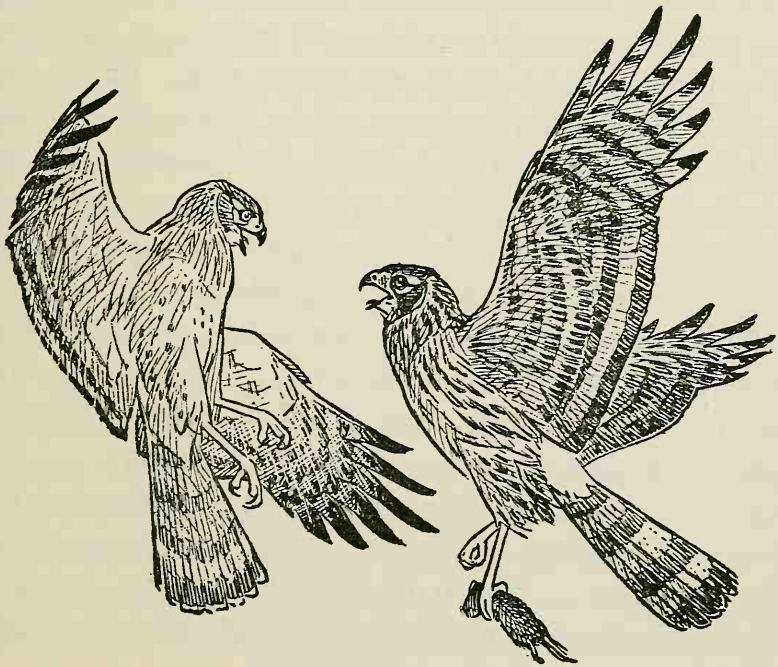
HAWKS, EAGLES, AND VULTURES

The languages of hawks and eagles depend somewhat on their methods of catching food. The vulture has claws too weak for grasping prey, so he must soar in the sky, constantly watching for dead animals. He also closely watches all other vultures and his sharp eyes miss no tiny movement in the sky. When he sees another vulture spiral earthward, he flies rapidly in that direction to see what food has been found.

The soaring hawks or Buteos (including the eagles) soar high over the land, looking for live animals they can

attack. When a rabbit or ground squirrel is seen, down comes the red-tailed hawk from the sky like a thunderbolt to strike its terrible claws in the animal's back. The screams of such a hawk are warnings to similar hawks to stay away from the territory where the redtail is flying and leave his game alone.

The harrying hawks, such as the marsh hawk and the kites, sweep low to the ground, particularly over swampy country. They dodge back and forth as they fly, harrying and worrying animals such as rabbits or mice, until they get a chance to grab them. Two such hawks, working together, seem to signal each other how to duck or dive by their wing movements. Their screams are probably territory-claiming cries.



The Accipiter, or bird hawks — such as the sharp-shinned, the Cooper and the goshawk — hide in the trees or bushes and suddenly dive out on birds who are feeding nearby. The scream of one of these hawks is made to strike sudden terror into their prey.

The falcons are the great speedsters of the sky. They dive at over a hundred miles an hour on individual birds or flocks. The language of the falcon's movements is often meant to split birds away from a flock by frightening them with bullet-whistling dives. Then the prey can be struck down one by one. Like most hawks, falcons give screams to claim territory near their nests.

The hovering hawks include the sparrow hawk (who is also a falcon) and the white-tailed kite. These small hawks hover over fields on swiftly beating wings, close enough to the ground so their very keen eyes can detect the tiny movements of grasshoppers, mice, lizards, and small snakes among the grass stems. Then down swoops the hawk to strike its prey. Often one member of a pair screams to the other to come join it in the feast. The sparrow hawk has a shrill whistle, as does the kite, that may be either a warning of alarm or a challenge.

Many times a hawk has screamed at me when I approached its nest. The scream, full of alarm and worry and challenge, calls its mate. Then the two of them circle about screaming repeatedly until I go away.

The mating language of most hawks consists mainly of motion, though occasionally two scream in unison. Usually the male marsh hawk, for example, sweeps in great circles high above the female, then plummets earth-

ward, somersaulting several times, just misses the ground and swoops upward again. The rushing sound of his wings is like a whistle in the air. Soon the female joins him. In the case of some hawks, such as the duck hawk, the two may fly clear out of sight up into the blue, and then come tumbling down together.

NIGHTHAWKS AND SWIFTS

The nighthawks — including also the poorwills and whippoorwills — are creatures of the gloom, seekers of moths and other night-flying insects, whom their widespread and well-haired mouths are especially adapted to catch. The swifts are dazzling fliers of the daytime.

I have heard the poorwills calling "Poo-woo poo-woo" in the early dawn, a cry of mate to mate and of territory claiming. It comes from the dense brush of the California chaparral, and I have come upon a poorwill suddenly so that it rose up from under my feet like a great, fluttering moth. The whippoorwill of the East and Southeast is also a brush- and tree-dwelling bird, and its soft, lovely and plaintive cry rises in the summertime evenings from along every roadway.

In the great plains of Colorado I have watched the nighthawks erratically trace pathways through the evening sky, then suddenly zoom to earth and boom their wings like a thunderclap, all of them together doing this as a sort of pattern or game, even while they were catching insects. While they play in this way, they call to each other with a kind of nasal, unmusical squeak, a social cry of good companions, like the shouts of boys and girls playing tag.

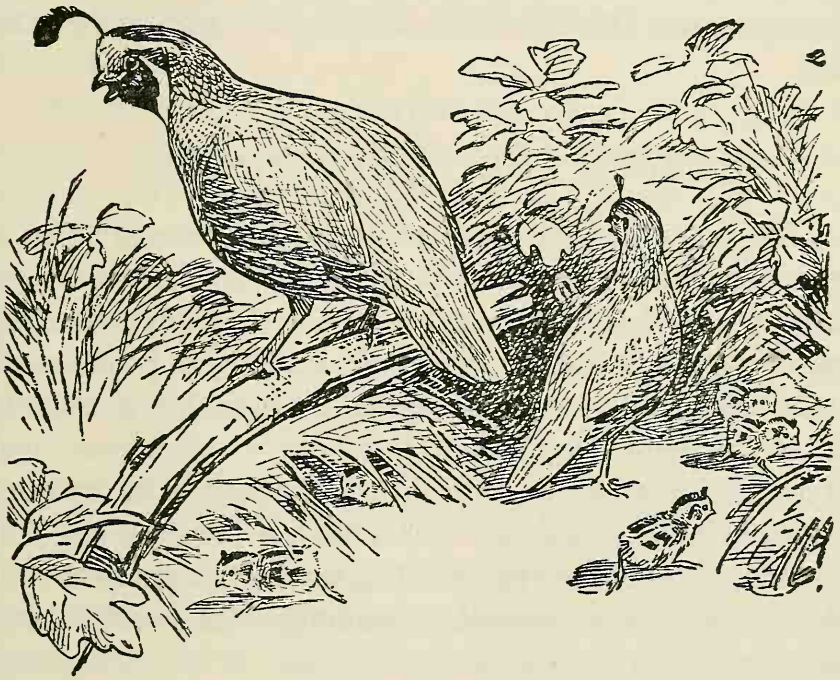
Over the Great Plains by day I have watched the swifts perform whirling, sweeping dances between me and the sun. Time and again dozens of the birds would sweep across the sky in great half-circles at dazzling speed, over and above each other, then tumble downward through space, only to swoop up again straight into the sky so fast they changed in a few seconds to almost unseeable specks. All the time their excited and spirited chippering came down from the heights. This, in the language of the swifts, means fun, joy, companionship, a game they are playing even while catching high-flying insects on the wing with incredible expertness.

DOVES, PIGEONS, AND QUAIL

Wild pigeons and doves have developed signals of alarm and motions of defense against enemies that the tame pigeons have rare need for. The white tail feathers of the mourning dove flash in the light like mirrors when a pair of these birds take to the wing in startled flight. The flashing feathers, along with a sharp cry of alarm, send a signal to other nearby doves that danger is near. These doves also give out a clear, whistling sound from their wings as they fly that may sometimes serve as a warning, other times as a social gathering signal.

The "Coo-coo-coo" of the mourning-dove male is a delightful song of late spring and early summer. The male also seeks to impress the female by suddenly rising with violent wing flappings straight up into the sky for a hundred feet or so, then gliding back on nearly motionless wings. The two mates often express their love by long periods of caressing each other's bills.

While flocks of pigeons and doves seem to be held together by little more than love of companionship, the quail and bobwhites are much more cooperative in relation to danger and food. "Wheee-oooo!" whistles the California quail who is on guard when an enemy appears, and into the bushes the flock runs, or takes off on whirring wings for distant parts.



Quail and bobwhites are both great conversationalists in their flock movements. Quail scold each other with a "Ka-ka-ho!" cry. There are soft "Cut-cuh-cuh!" notes of companionship, keeping the flock together. There are the querulous notes of young birds asking their elders where the food is. There is the loud gathering cry of the clan, the "Bobwhite!" and the "Quer-ka-go!" that bring the flock

together after it has been scattered by a fox or dog. At night the flock forms a circle with heads out, all ready to fly, while a little humming, happy note, a kind of lullaby, sings them to sleep.

In the spring the flocks are broken up as mating takes place, with the usual fights between the males over territory and females. Later, the father helps stand guard over his family. At his sharp, whispering cry of warning, the young scatter like little leaves in the grass and are hard to see.

OWLS AND ROADRUNNERS

The great horned owl has been well compared to a ghost because of its ability to fly so softly through the air that no sound is heard until its claws close on a luckless rat or rabbit. It lives in the woods mainly, and, like most owls, each individual has a definite range that it calls its own. The deep "Hoo hoo-oo hoo-hoo!" of the horned owl is a signal to all other horned owls that this is its territory and they must stay away. The sound, mysterious and full of menace, may also be useful in striking such terror into the hearts of small animals as to make them run foolishly into the open.

The horned owl squalls like a cat sometimes during the mating season, probably calling to the female while also challenging or threatening all other males. Doglike yelps are also heard at this time and sound like the eager cry of the male seeking the female. Only once have I heard an owl scream in what must have been fear, and that was when a red-tailed hawk attacked a horned owl in the top of a tall eucalyptus tree one day and knocked it to the

ground. But its blazing yellow eyes and snapping beak warned me not to come too close.

The scarecrow-like roadrunner is one of the fastest of all running birds and an expert at catching snakes and lizards in the desert country. Roadrunners have been so hunted in most places that they are very wary of men, but in wild country I have seen them show considerable curiosity, cocking the head from side to side and eying me curiously.

One morning, just when the sun rose in the desert, I awoke in my sleeping bag to hear an extraordinary uproar of hoots, chirps, cooing noises, and many other odd noises almost impossible to describe. A roadrunner hopped out of a big bush where the noise had come from and ran off. It was certainly performing some kind of song to woo a female and probably to claim territory for itself. But this song is rarely heard.

WOODPECKERS AND FLICKERS

The merry hammering of woodpeckers and flickers, all the way from the light "Rat-a-tat-tat!" of the tiny downy woodpecker to the loud thunder of the big pileated woodpecker, forms a language the American wilderness would sadly miss. It is the talk of sturdy, independent birds, who work hard for their living by cutting holes in bark and wood to get at the insects inside. The beating sound of the bills is a message telling other woodpeckers, "This is my tree!" The bright colors on the heads and bodies of most woodpeckers are also message senders, telling what kind of woodpecker is working and warning other woodpeck-

ers to stay away. Of course, in the mating season, the bright colors are used to attract the females.

In the summer most woodpeckers are rather quiet except for their hammering. But in the springtime the trees are often filled with their chattering cries as well as the hammering noises, while their wings flash bars of light as they fly constantly back and forth. The males are courting the females and their chattering means either that they spy a prospective mate, or exasperation and rage because they see a rival male. Many times you will see one woodpecker chasing another round and round a tree in spiral fashion, moving with their jerky motions. After weeks of this excitement, chasing, and some fighting, the mates are finally chosen and the territories decided upon.

PERCHING BIRDS

By far the greatest number of birds belong to the order of perching birds, which includes all the sweet singers. These birds have developed what are called territories to a very high degree, and it is the purpose of the song of the male of each species to tell all other males with his song that he owns the neighborhood where he is singing. Some birds sing a different song later that seems to be a song of joy in nesting.

The other sounds these birds make are mainly social calls of mates to mates or to members of a flock. They may be war cries between fighting males, or cries of alarm when an enemy comes near. It is often possible to decide what the sound means by watching what the bird is looking at when it cries.

FLYCATCHERS

Flycatchers are without the territorial song of the songbirds, but they do indicate territory with call notes and occasional chattering war cries. Kingbirds even seem to scream with rage sometimes when they fly at a hawk or crow who comes near their nest.

A flycatcher always signals to you that it is a flycatcher by the distinctive way in which it catches insects. Most flycatchers sit on the outer ends of tree limbs watching for flying insects. If one is seen, the flycatcher suddenly springs into the air, snaps up the fly in its wide beak, and circles back to the same branch from which it sprang.

Crows and jays are among the most intelligent of all North American birds. They certainly have about the most extensive language, of which only the highlights can be given here. These birds need to teach their young the tricks of life and talk much more than most other birds, which means also that they can learn new things more easily. A young crow, for example, does not instinctively know the appearance of an enemy the way a young robin knows. The crow youngster has to be taught fear of a cat by the way its parent reacts to such an enemy.

On our ranch the flocks of crows pass back and forth almost daily on their way to and from their roosts and their feeding grounds. The clear "Caw, caw" of the crows sounds from the sky and is used as a signal to tell of food found and to draw the flock together. A harsher, shriller cry of alarm may suddenly speed up these big black birds, and, if they are shot at by guns, they tend to scatter and intelligently put as many trees as possible between themselves and the shooter.

In attempting to spy into the nests of crows on cliffs I have been called a wide variety of uncomplimentary names by the parents and even suddenly attacked by them. It was amazing how the inflection of the "Caw-caw!" cry could be changed and charged with different emotions of hate, anxiety, fear and despair as I approached nearer and nearer to the precious nest.

Crows become very loud and noisy when they find an animal they feel they can safely bully and pester. I once saw them mob an owl and peck the poor creature to death, their screams sounding like those of an emotional

human mob at a lynching. Crows have also been known to attack one of their own members and kill it, after a noisy conference that has reminded some observers of a courtroom scene, with a judge and jury. Whether a crow law had been broken, or whether it had been simply decided to get rid of an old and sick crow, was not definitely determined.

When crows feel they are unobserved by man, they carry out many seemingly complex conversations and also have been heard to warble a little song that may be an expression of affection between mates. The movements of crows also have rich meanings to other crows. In the flock

there is a definite peck order, very similar to that found among chickens. (See pages 37-38.) The best fighter is at the top of the social order; he gets the pick of the food, and first choice of a mate. When two crows fight they caw angrily, bristle their feathers to look bigger, wiggle their wings and strike with beak and claw, often tumbling over and over. The winner can thereafter always drive the loser away by just bristling. Even the expression of the eyes is important and shows love or hate, trickery or playfulness.

The king crow seems to lead the flock, but sometimes there is angry disagreement about where to go or what to eat. In the face of danger, however, such quarrels stop quickly. A crow flock attacked by a duck hawk will suddenly bunch so closely together that the duck hawk does not dare dive into the mass.

I am convinced that some birds, including the jays, titmice, crows, blackbirds and probably several other kinds, have a certain amount of real intelligence, and even foresight. One Steller jay in the mountains learned to attack a cat just as it was coming out through a swinging screen door at the moment it was temporarily helpless to fight back. The jay seemed to anticipate just when the cat would come, would fly down to strike at it with wings or claw and then fly away with a loud and rapid "Tchay-tchay-tchay!" of triumph. Actually, individual birds vary greatly in intelligence and ability, and each within a species has a distinct personality, so that the variations of language used are far more rich in detail than could ever be told in this book.

All jays are alarm callers when a new animal enters their forest or hillside, and small animals take warning

from these notes and run for their lives. By the tone of the sound you can tell whether something large and dangerous is coming or just an animal they think they can pester. When they themselves turn into nest robbers, they become suddenly very silent and sneaky in all their actions. However, when robbing squirrels of their hidden nuts, jays shout with triumph and call names at the squirrels as loudly as the angry squirrels shout at them!

I have heard jays squeal like rabbits, and even make a noise like a car motor; but I became most excited when I heard a crested jay singing. It was a weak, warbling song, but nevertheless a tuneful one, probably sending a message to a mate.

SOME OTHERS

Most of the other perching birds are real songsters, using their songs not only to show the territory each male bird feels he owns, or to lure or charm a female, but also just bursting forth with the joy of living. In the springtime there is much spreading of wings and feathers and other displays of males at the edges of their territories. If these displays do not drive the rival male away, then there may be a fight or half-fight, with two birds clinching and pecking furiously. You often see two birds flying in and out of the bushes, first one chasing, then the other. Many birds, like the towhees and wrens, make a buzzing cry of anger at such times.

Most of these birds mate for life, but between the mates all is not necessarily smooth sailing. Birds who become very angry at each other often make so much noise about their nesting and raising of young that they attract enemies who eat up the young. Wiser couples learn to be

more quiet. Males urge females to build nests, but rarely help. Once a male titmouse who had entered an old woodpecker's hole in a tree urged his mate to use this as a nesting spot by making noises like a baby bird, but she turned him down, much to his annoyance, and he scolded her sharply. The female, in her turn, became much annoyed at the male later when he did not bring her food as often as she wanted when she was setting on the eggs. At this time, she called her mate with noises like those of an older nestling bird. This use of baby talk by both male and female at nesting time is common among many birds, and is useful in conveying ideas. The fluttering of wings close to the body and the making of baby talk is often used by a female to attract her mate, while the male sings and displays his wings and tail feathers to attract the female.

Many perching birds signal alarm to each other by the flashing of white tail feathers and other kinds of markings, as they fly.

Tiny movements may have meaning to birds that are missed entirely by a watching man, and much careful observation and study of bird language remains to be done.

CHAPTER 6

Reptiles, Amphibians, and Fish

Because their brains are smaller and because most reptiles, amphibians, and fish let their young shift for themselves, almost as soon as born, the languages of these animals are much less rich than those of mammals or birds. Also, what language they have is almost entirely instinctive — that is, without conscious thought behind it. However, there is a tremendous amount yet to be learned about these languages, and even what is known would probably fill a book by itself.

REPTILES

TURTLES

Turtles seem to range in intelligence from the rather stupid but extremely dangerous and powerful snapping turtles to the comparatively intelligent and gentle tortoises. Tortoises make excellent pets and even show affection towards a master. They communicate this affection by trying to crawl onto his foot, or even by resting a head against his leg and looking up into his eyes.

The alligator snapping turtle has a tonguelike device in its mouth that looks like a white grub; the turtle wiggles this as it lies still on the bottom of a river or pond; it thus lures a fish close enough for the turtle to snap out its neck and jaws like a striking rattlesnake. The snapping turtles and soft-shelled turtles are noted for their viciousness. They warn you they are about to strike by pulling back their head and neck and gazing balefully with their eyes.

Very few turtles make any sounds beyond a slight hiss of warning, but some of the tortoises, who live on land, are known to make repeated rasping noises over and over in the mating season, probably calling the females. Some of the aquatic terrapin — turtles who spend all their lives in water — show a remarkable courting behavior on the part of the male. He swims beside the female underwater, and, as he does so, reaches out with one of his front arms and with a long, peculiar-looking nail on one finger tickles or strokes the female along her neck, wooing her by this method.

Most turtles have learned from sad experience to keep a constant lookout for enemies and to pay attention to the slightest warning movements of their own kind. Many a time I have sneaked up to a Pacific pond turtle only to have it suddenly plunge into the water, with others nearby instantly following. Most turtles pull their legs and head inside the protection of their shell when attacked by an enemy, but only the box turtles have complete protection. In their case, the plastron or belly cover folds up in several places like doors and is held there by powerful muscles.

Musk turtles have glands which give out a powerful odor, a bad smell that helps discourage animals from eat-

ing them, and which is also a signal of the animal's fear and anger. It is also used to let other musk turtles know of the presence of one of their kind, and as a calling card to be sent the female by the male.

A female turtle found digging in the sand or ground of a beach or bank is almost certainly preparing to lay eggs. She covers them over carefully and then leaves them to incubate by themselves.

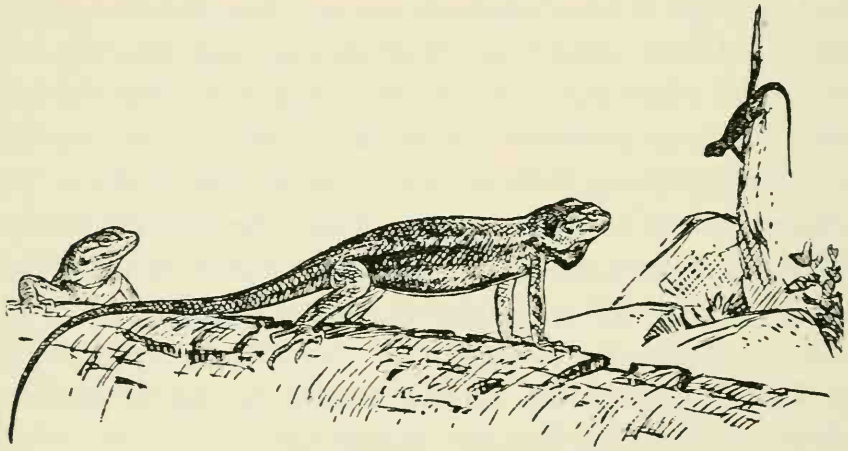
ALLIGATORS

Alligators are found wherever there are warm and humid swamps in the Southern states. They are very much afraid of men, and disappear quietly and quickly into the water when they hear a man approach. The big bull alligators can produce the loudest noise of any reptile: a deep, booming bellow. This sound echoes from the swamps most loudly at mating time. Besides the sound, the bull alligator sends out wave after wave of fetid alligator smell from his scent glands, presumably to attract his mate. A grunt of warning is another alligator sound that is occasionally heard. It will send a group of basking alligators plunging into the dark water.

LIZARDS

A lizard who is watching for an enemy will usually move its head from side to side in short jerks while its body is lifted off the ground. If it sees something it considers dangerous, it scuttles away at full speed, or even lifts its body higher and runs on its hind legs (as collared lizards and some others do). The instant other lizards notice it is running, they too run, though they soon stop and look around alertly to see what caused the disturbance.

Certain lizards of the Iguana family, particularly the common fence lizards or swifts, signal each other with the colored markings on their bellies and throats. Most fence lizards have blue bellies, which, in the males, are deeper in color and extend up to the throats. Each male fence lizard claims a territory by standing on the highest point of a pile of rocks or sticks and pushing its body up and down with its front legs. This flashes the blue belly in the sunlight and acts as a warning to other males to stay away, while the signal at the same time calls to any female who is near to come to investigate.



Most lizards, when cornered, open their mouths wide and give a hiss. Alligator lizards, though seldom much more than a foot long, hiss quite fiercely and open their mouths so wide, to express their warning and anger, that they no doubt scare many animals that have started to attack them. I know a puppy who once jumped at one of these lizards, and was so impressed with its formidable appearance that he stopped his attack.

Many lizards communicate also by means of smells.

Fence lizards have glands along their thighs that they rub on the sticks and rocks over which they pass. These scent telephone posts undoubtedly tell other lizards the nature and sex of the lizard who left them.

The bright colors of the gecko lizards of the Southwest are useful in imitating brightly colored poisonous creatures like the Gila monster and the coral snake, and so protecting the gecko from attack. The American chameleon or anolis seems to show inner feelings and moods by the color of its skin. When it feels peaceful and happy its skin is usually brown, but if it becomes angry or frightened it often turns bright green. These lizards also display brightly colored throat fans to attract females and to warn away other males.

Most lizards are insect eaters. You can often tell when they are hunting insects by their catlike creeping over the ground. When near a fly, the lizard gathers his leg muscles together, quivers all over slightly, and then rushes forward to grab his prey.

Most lizards are able, when pursued, to leave their tails in the clutches of their pursuer. And the alligator lizards are often able actually to throw their tails loose when they wish to distract an animal who is chasing them. Horned lizards rarely lose their tails, but some of these remarkable animals can suddenly increase the size of the eyeball, make the neck rigid and then, giving a rasping sound, shoot a stream of blood from one or both eyes! This should indeed startle an enemy!

SNAKES

A good deal of the language of snakes seems to be carried on by means of smell and is therefore largely untrans-

latable to men. Most snakes leave their smell along the ground as they travel over it, particularly when they leave their droppings, and this smell is detected by the forked tongue of another snake. As you watch a snake move, you usually see this black, forked tongue stick out at intervals to test the ground. A male snake can easily follow a female who has left her smell trail behind her, and he will know from the smell whether she is ready for mating and, if she is, will show his increased excitement by the rapid flicking in and out of his tongue. Most snakes also track their prey down by smell, striking at it when they get near enough to see it move.

Most snakes signal their intention to strike by drawing back the head and partly coiling the body. The rattlesnake, of course, uses its rattles to warn potential enemies to stay away, but keeps the rattles quiet when it prepares to strike its living prey.

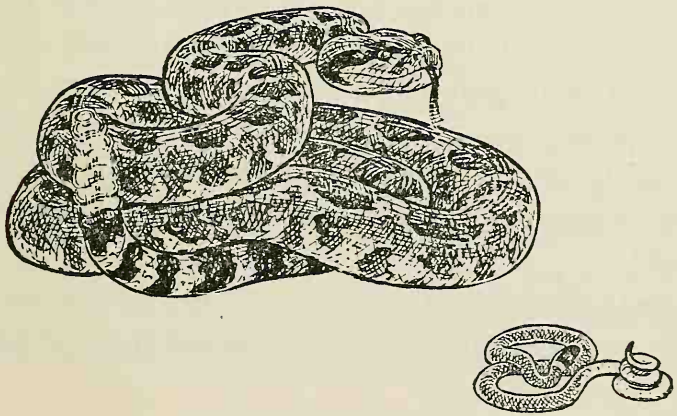
The comparatively high intelligence of the very successful garter snakes was illustrated by what happened when a group of them was thrown a frog for food. The snake who caught the food wriggled its tail at a great rate, making so much noise and disturbance that the other snakes were distracted and didn't notice that it was eating the frog until too late! Garter snakes also make considerable use of a bad smell, which makes most animals glad to leave them alone.

Many comparatively harmless snakes assume very threatening attitudes when they are attacked, but these are mainly bluff. The common water snake (*Natrix*) is so sinister-looking, especially when it flattens its body and hisses viciously, that many people take it for a poisonous snake. Another snake that fools many into believing it is

dangerous is the common hog-nosed snake (also called puff adder) of the central United States. This snake startled me one day in Colorado by puffing up its body to about five inches thick and hissing at me venomously. But, when touched, it rolled over on its back and pretended to be dead, opening its mouth in a ludicrous way. When turned over on its belly again, it immediately flipped back onto its back, as if insisting that this was the only proper way for a dead snake to look!

Certain snakes that superficially resemble rattlesnakes, such as the gopher snake, often beat their tail rapidly in dry leaves to frighten you. The gopher snake or bull snake also has a ferocious loud hiss that it uses very effectively for bluffing purposes. Another snake that is a successful bluffer is the Western ring-necked snake, who twists his tail into a corkscrew, displaying the bright red underside, and frightens his captor into thinking he is poisonous.

It is interesting to watch a snake prepare to catch a mouse. If it becomes interested, its tongue begins to come out and flick around more and more rapidly, as it smells



Rattler and Ring-neck

the mouse. Then gradually the snake's head begins to move from side to side, following the movements of the mouse. If the mouse comes near, the snake will suddenly strike it, seize its prey in its jaws, and throw a loop of body over it to hold it down. After death, the body of the mouse is licked all over with the snake's tongue, and then is swallowed whole by the wonderful snake method of detaching the lower jaw from the upper.

AMPHIBIANS

SALAMANDERS AND NEWTS

People without knowledge of nature often mistake a salamander for a lizard. The difference between the two animals is that the lizard has a dry and scaly skin, while the salamander has a moist, smooth skin. Salamanders and newts are generally found in moist woods or meadows or in streams or ponds, and, when the weather becomes very dry, they often hide in holes in the ground or under rocks and bark.

Most salamanders twist their bodies and try to escape when you pick them up, but the slender ones of the West coast wriggle and lash so violently when touched that it is quite difficult to grab them. Many salamanders lose their tails if roughly handled. This helps them escape enemies, particularly snakes, who may grab the tail end only to find it coming off in their mouth while the salamander runs off!

A few salamanders make squeaking noises when disturbed, and the Pacific giant sends out a screaming and

a rattling that warn you to leave it alone. Some salamanders, when bothered, arch their backs like bows, with the midsection bowed down and the head and neck up. Apparently this is a bluff to make you think the salamander is poisonous. If touched, the Eschscholtz salamander of California not only bluffs in this way, but rocks back and forth on stiff legs and gives off a milky, sticky fluid that stings if it gets on you.

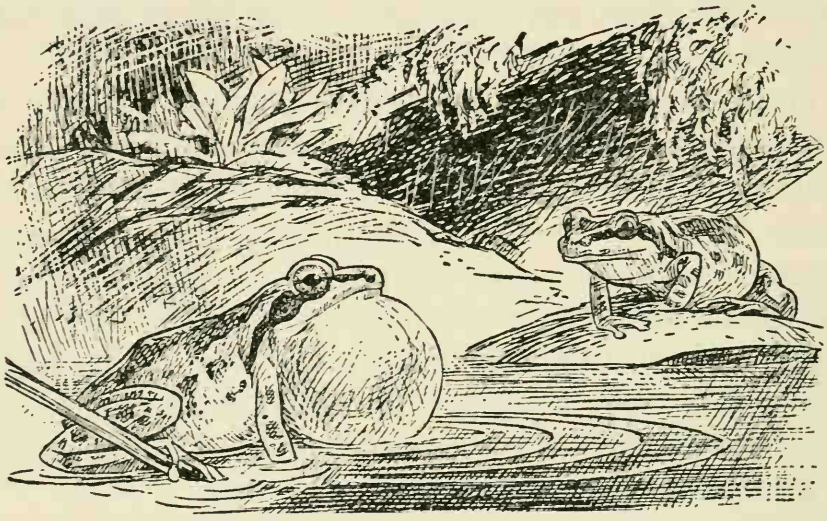
Different male salamanders have different methods of courting the females. The Eschscholtz salamander, for example, rubs his body over the female and gets her to follow him into water by lashing his tail over her neck. The tiger salamander male and female may nip each other, do much body-rubbing underwater and lashing their tails about each other until the water boils. Most salamanders mate and lay eggs in ponds or streams, but the arboreal or tree salamander of the West lays its eggs in damp places in the woods, often in the crotches of trees.

FROGS AND TOADS

Frogs and toads are much more noisy than salamanders, but most of their noises come from the male when he is attracting the female in the mating season. Thus the peeping of small tree toads and the deep "Jug-o-rum!" of the giant bullfrogs have both the same function. There is undoubtedly also a lot of joy of life in the sound plus a social feeling of being together in a great singfest.

The males usually gather in the mating pools before the females come, and there they begin calling them. After a while the females may answer from the land with lighter

voices. When they do, the males usually greatly increase their excited chorus. When the females enter the pool, there is usually much pushing and shoving between males, but no actual fighting. The female usually accepts whichever male gets to her first.



A Male Tree Toad Sings

Frogs and toads make various croaks, squeaks, chirps and similar noises when frightened or captured. These noises serve to warn other toads and frogs and possibly to bluff or startle whatever has seized them into dropping them. Some toads, in particular the giant Colorado River toad, make clucking noises like chickens when they are sleepy and happy. Bullfrogs are noted for their almost humanlike scream when hurt. They also give loud yelps when startled. Some bullfrogs pretend to be dead when captured, but quickly hop away when let go.

Fish that swim in schools, like trout or shiners, communicate with each other by the flash of their silvery scales. The turn of a frightened fish's body, as the tail beats swiftly, usually causes the silvery underscales to flash a warning to nearby fish in the school. The whole school then dives downward toward safety. Certain fish may also discharge a smell into the water, which warns all nearby fish that danger has come. They then retreat from the source of the smell.

The courting of the female by the male in many fish is quite elaborate and is very distinctive for each species. The male and female each respond to what the psychologist calls sign stimuli given by the other and go through a careful procedure in great excitement. The stickleback male, for example, starts the breeding season by establishing a territory over which he is ruler. He knows another male is approaching if he sees the red color of its belly. So he immediately stands on his nose on the bottom of the stream or pond and waves his fins. Usually this warning is sufficient to send the other fish away. Otherwise the first attacks the other male by hitting him with his snout, particularly if the second fish also stands on his nose on the bottom. After a few bites on body and fins one of the fish swims away in defeat.

As soon as the male sees a female he acts very differently. He knows her by her large plain belly, and he shows off his red belly to her, beginning a zigzag dance. This is as if he said to her: "See how handsome I am and how well I can dance!" The female responds by sloping

her body down toward him in the water. The male then dances around the female as they swim down into the water, and the female swims into a nest of rushes that the male has built at the bottom of the pond or stream. Here the male nudges her with his nose, and, in obedience to his command, she lays her eggs.

As most fishermen know, fish telegraph their intention to feed by their more active motions and their interest in small objects in the water. To catch an insect, they "strike," which means simply that they make a sudden quick rush with wide-open mouth and then snap it shut on the prey. A fish telegraphs its dislike of being caught with a hook by leaping high and shaking its head violently from side to side to get rid of the obstruction. Some wise old fish have learned from harsh experience to approach every new thing with great caution. You can see them eying a shiny new lure and then lazily turning away with a contemptuous flip of their fins, as if to say: "You can't fool me with that thing!"

Sometimes, when chased by a mink or otter, an experienced fish will suddenly flash its silvery belly toward its pursuer, then quickly turn in such a way that the silver disappears and the fish merges with a dark background. The mink is lured by the bright color and overshoots its mark. By the time it has turned, the fish has disappeared. Catfish, swimming through muddy river water, keep the barbels or feelers on their heads stiffly erect, seeking to touch animals they can catch and eat.

CHAPTER 7

Insects and Their Relatives

The world of the insects, with its hundreds of thousands of different species, presents another field in which little has been done as yet to study animal communication. I hope what is said in this book will encourage the reader to take part in future exploring of this marvelous miniature world.

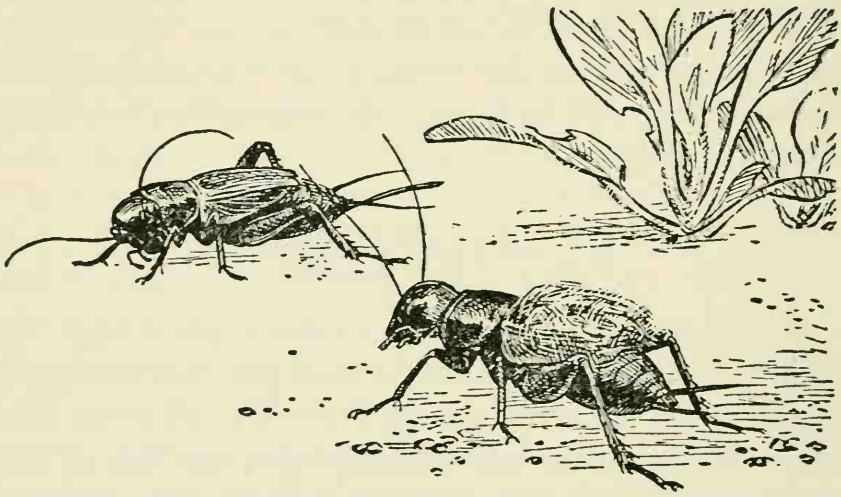
SOLITARY INSECTS

Solitary insects, such as grasshoppers, plant bugs, and most of the beetles, have little need for communication except at the time of mating. However, many of them have warning colors and warning signs that tell us they are dangerous or potentially dangerous. The brilliant, metallic colors of a wasp warn us of her sting. But there are also perfectly harmless insects that copy the harmful ones in order to use their colors to escape from enemies. Several flies and moths do this copying of the more dangerous wasps and bees and are hard to tell from them until you look closely and see the two wings of the flies and the hairy scales of the moths.

Many insects communicate their emotions with the sound of their wings. Flies buzz with a particularly loud,

angry note when they are caught in a spider web. They seem to give a lighter, buzzing cry of joy when they break free from the web and fly away. A still different and peculiarly intense buzz is given at mating time.

The loud buzzing of male cicadas on a summer day is a call to mates, as is also the trilling of tree and common crickets. The noise is made usually by rubbing a leg against a wing at high speed. Only insects that use noises in this way to attract one another have genuine ears. The ears of a cricket are in its legs!



A Male Cricket "Sings"

Many other insects talk to each other at mating time by smell. Many male moths have featherlike antennae, which they use for detecting the smell of the female. This smell can often be told a mile away! Smell is also used by certain insects for protection and warning. The various kinds of stink bugs give off very unpleasant odors when handled, while the dark-colored bombardier beetle lifts up

his rear end at you and shoots a jet of ill-smelling gas in your direction.

Some insects, such as the wasp and bee, buzz a warning to you, while others, such as the velvet ant (a wasp, not an ant) and certain of the true bugs, squeak a warning. The squeak is made by rubbing the legs. Many grasshoppers, as they fly, make a loud clicking noise, which both warns other grasshoppers and startles enemies.

At mating time, many male insects try to impress the females with strange movements, dances and bright colors. Colors may also be used to confuse an enemy, as when the bark butterflies suddenly fold their wings and look so much like part of the bark that you cannot see them.

SOCIAL INSECTS

Social insects naturally need more of a language than solitary insects in order to run the affairs of their communities. But many of these languages are still completely unknown, or very incompletely known. Here, for the purpose of example, it seems best to show one language that is fairly completely known, the language of the bees. Someday naturalist explorers will make the languages of ants, termites and social wasps equally well-known.

The language of bees is quite complicated, but this does not necessarily mean that bees use reason and intelligence in communicating with each other. Instead, as with most animals, their language seems to be largely instinctive and emotional.

The average beehive numbers about fifty thousand to

seventy-five thousand individuals, or the population of a small human city. In this city, during the warm months of the year, there is intense activity, bringing in food and storing it and feeding and taking care of the queen, the young bee grubs, and the helpless drones. There is also activity in building the honeycomb, keeping the beehive clean and ventilated, and in repelling any enemies who might enter. All this requires various means of communication.

Bees talk to their grubs through the language of food. If they want a grub to grow to be an ordinary worker, they feed it bee milk — a mixture of honey and bee saliva — for the first two days, but after that they change it to a pap of honey and pollen. If they want the grub to grow up to be a queen, they move it to a large cell and feed it only bee milk, which makes it grow to be several times the size of the ordinary worker.

Bees have bee nurses who look out for the young grubs that live in the cells of the honeycomb. When these grubs get hungry, they begin to wriggle, and this is the signal for the bee nurse to bring the babies their honey and pollen food. When the grub begins to form itself into a motionless pupa before it turns into a real bee, this is a signal for the bee nurse to come and seal up the entrance of the cell with beeswax.

Other bees are living fans who stand near the entranceway and vibrate their wings so fast that it creates a current of air all through the nest to keep it ventilated on hot days. New bees join to help with this ventilation job if the day gets hotter. Still other bees are guards who stand at the entranceway and check on everybody who comes in or any animal that comes too near the hive. They can tell by

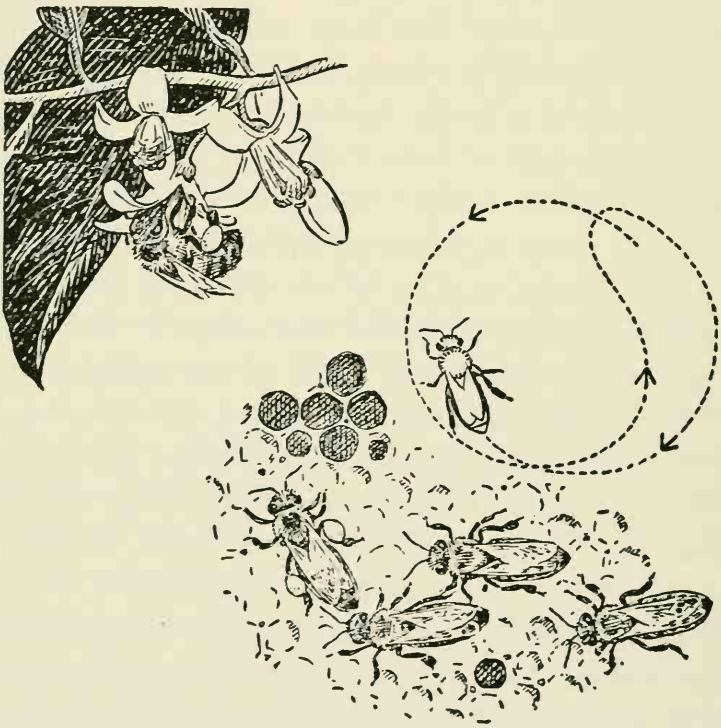
smell if any bee or other insect who comes to the hive entrance is a stranger and an enemy. Instantly they buzz with anger and rush forward to sting the newcomer.

When a hive prepares to swarm the workers seem to know they must produce a new queen. So they hang wax cups near the center of the brood-rearing area and get the old queen to lay an egg in each cup. These eggs soon hatch into little white grubs which are fed only bee milk by the workers, and this turns them all into queens. The old queen is not fed so much food as before, so that she grows thin enough to be able to fly. After the first new queen emerges from her pupa and her cell, the bees all become very excited and rush around, apparently deciding who is going to swarm and who is not. Those who are going to swarm gorge themselves on the honey stores, and then thousands of them rise in the air with an excited buzzing of myriad wings. They take the old queen with them and fly away with her to find a new home.

The new queen, as soon as she becomes mated with a drone or male, rushes around and stings to death all the other young queens, unless some of the workers prevent her. If they do this, she too may form a swarm of bees and fly away with them, leaving a still younger queen to keep the old hive going. Generally new queens fly up into the sky and the drones or males follow them, so that they mate in the sky, then come back to the hive.

The most amazing and complex part of the bees' language is when a returning bee tells the others in the hive where to go and look for food. Suppose the explorer or scout bee has found some good honey flowers about sixty yards from the hive. Almost as soon as she enters the hive, she begins to regurgitate some of the nectar.

The taste and smell immediately tell the other bees the type of flower she has found. They also detect its smell on her body hairs. If she acts excited about it, they know she has found a good place to get nectar. She shows both the distance to the food and her excitement by a circling or "round dance," circling first to the right and then to the left, repeating this vigorously. This kind of dance tells the other bees: "There is plenty of food near the hive!" They begin to fly out in all directions, but look only near the hive until they find the nectar in the flowers.

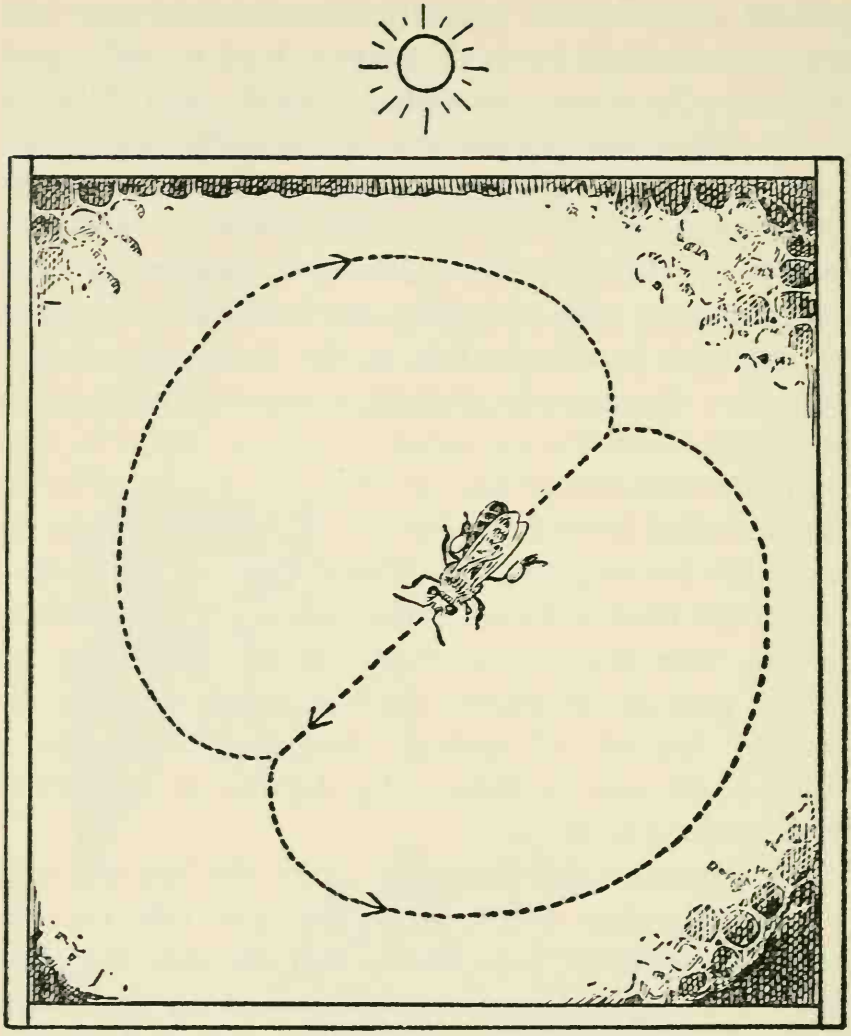


A bee discovers orange blossoms (upper left). She returns to the hive and does a "round dance" (center) to tell other bees to search for food within 100 yards of the hive.

If the flowers found by the bee are farther away than about one hundred yards — say two hundred and eighty yards from the hive — she does a different kind of dance. In this dance she wriggles her tail violently and makes a complete circle to the right, moving forward, then in the original direction. Next she makes a complete circle to the left and moves forward again in the original direction, still wriggling her tail. The direction she moves in a straight line in this "wriggling dance" shows the direction for the other bees to fly to reach the nectar, since this movement is always made in relation to the direction of the sun. If the food is found in the same direction away from the hive as the sun is, then the bee makes her wriggling dance go straight up the vertical hive. If the food is found in the opposite direction from the sun, then she moves straight down. If, during the straight part of the dance, the bee moves say fifty degrees to the left of vertical, then the nectar she is telling about can be found fifty degrees to the left of the sun, and so forth.

In this remarkable language dance the bee not only tells the direction of the food, she also tells the distance. Experiments have shown that she tells the other bees the distance of the food by how fast she makes her circles in the wriggling dance. If not much farther than a hundred yards to the good flowers, then she does the wriggling dance circles very rapidly, often as much as nine circles in a fifteen-second period. If farther away, she does the dance slowly; for example, she makes only two such circles in fifteen seconds if the food is about a mile away.

The other bees watch and smell the scout bee to get

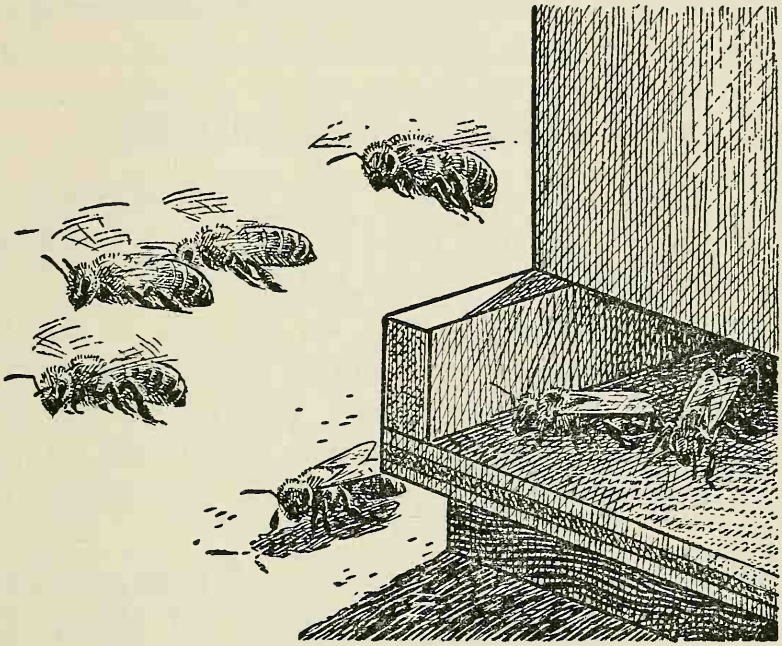


THE BEE'S MAP

The bee tells how far to go by the speed and number of times she repeats dance.

She tells in which direction to go by running (between circling) in the direction of the food as it is related to sun direction. Here it would be left and at a 135 degree angle away from the sun.

her message, then they leave the hive in a steady stream. All but the youngest and most inexperienced bees fly in the right direction and go the right distance to reach the discovered flowers! Is this not a remarkable language?



Bees do not hear very well through air, it has been found, but they have sense organs on their legs that help them hear through solids. Thus, in a hive, they hear sounds brought to them through the walls of the honeycomb. If they hear a loud buzzing noise at the entrance-way, they know an enemy has come there and they may swarm out to fight. The queen occasionally makes a strange piping noise, which may mean that she is hungry or perhaps that she is ready to swarm. Also two queens may make this noise when they start to fight each other.

The smell of the queen is very important to the bees in the hive. This smell spreads to all the bees in the hive and gives them their own distinctive hive smell that helps them distinguish between friends and enemies. They can also tell from the smell of the queen when she needs more food and when she should be prepared for swarming.

SCORPIONS AND SPIDERS

Scorpions, whip-scorpions and pseudo-scorpions all have large pincers, like those of crabs, with which they seize their prey. The scorpion has the advantage of also possessing a dangerous sting on the end of the tail. Scorpions wave their pincers and lift their tails menacingly as a warning to leave them alone. They can see only for a short distance, but the instant their pincers run into any small creature, they seize it, then whip over the tail and sting it.

Scorpions and their near relatives are most remarkable for the courtship dance of the male and female. The pincers of each pair touch and then seize hold of each other, like a man and woman holding hands at a folk dance. Then they begin a grotesque dance back and forth and around, which may go on for several minutes or even longer until the female is ready to mate.

Spiders have been found to have several means of communicating with one another, but this is mainly at mating time, since the rest of the time they have little to do with each other. They do have one or two ways of

communicating a threat to those who would attack them. Both tarantulas and jumping spiders, as well as several other kinds, hold up two or more of their front legs in a threatening fashion and also display their sharp fangs, all ready to bite. They may even jump a little bit toward you in a threatening way.

But the strangest communicating methods are used by the male spider in his attempt to woo the female. While there are great variations in the wooing of spiders, there are two general types, those done by feel and those done by sight. Most spiders have extremely poor eyesight and the females may quite likely mistake a male for an edible insect and attack him quickly. With such spiders, it is necessary for the male to send a feel message to the female that will convince her he is a good mate.

Most spiders have tactile organs in their legs that are very sensitive to touch. Other leg organs are sensitive to chemical stimuli in much the same way as we smell and taste, but still sufficiently different to be considered a new and different spider sense. The male spider approaches the web of the female and sends her a message by pulling on the web. If she is interested, she may pull back. When he gets near to her, he touches her with his front feet and this touch, if done gently and carefully, may convince her in time that he is the one for her.

The tarantula male approaches the female on the ground and begins to hammer at her with his four front legs. These "love taps" finally rouse her to tap back.

Spiders with good eyesight, such as the very interesting jumping spiders, use a combination of arm signals and brilliant colors for mating communication. The males of

these spiders, and sometimes the females too, are brilliantly colored. Once he has attracted the female by his bright colors, the male begins to wave his arms in fantastic ways, and sometimes whirls about in a little dance, in which the female may join him.

CHAPTER 8

Finding the Answers to the Unknown

In 1492 Columbus set out to find a way to reach the East Indies. Instead he discovered America, a vast new world. There still exist new worlds to explore, many of them right on this planet, with no need to take rocket ships off into space. The secret world of animal language is only beginning to be opened up to man. You can learn the languages of animals about whom almost nothing is now known, or you can, through your exploration and study, vastly increase our present very insufficient knowledge of those that have been studied in part.

The chief things needed for this study are intense curiosity, time, and a willingness to investigate carefully and observe the animal you are studying until you unravel the secrets of its language life. To do this correctly you should follow the steps suggested in this book, and should learn how to use the scientific method, which means simply applying systematic common sense, looking at things from all sides, and remembering never to jump to conclusions but only to come to them after long and careful testing and research.

It is wise to remember that animals are different from human beings, often very far different in their reasoning powers, and also in their means of communication. Some of them observe tiny details that we would naturally miss. Others have a keen sense of smell and so read messages brought by the breeze that have no meaning to us at all. With nearly all animals, it is extremely difficult to find and understand all their secrets of communication.

Many animals live in environments or places almost beyond our ability to reach and study, such as the mole and gopher in their underground homes, or the bats who fly through the hours of darkness. But we should be poor naturalists and poor human beings if we allowed such difficulties to discourage us. Already naturalists have found that by using a dark red flashlight beam in the night they can study the lives of many night animals without disturbing them. You too might make similar discoveries.

Perhaps one of the best ways to study animal languages is to go into the places where they live and become so intimately acquainted with them that you can make friends and learn to talk to them. A lady in England turned her house in the country into a house for birds. The wild birds came and went in it as free as the air, and fed from her hands. She learned many intimate secrets of their lives. From my own animal friends I have learned much of what has gone into this book.

When you talk to animals it is best to use a high voice or a very soft voice, since they associate such sounds with their own children.

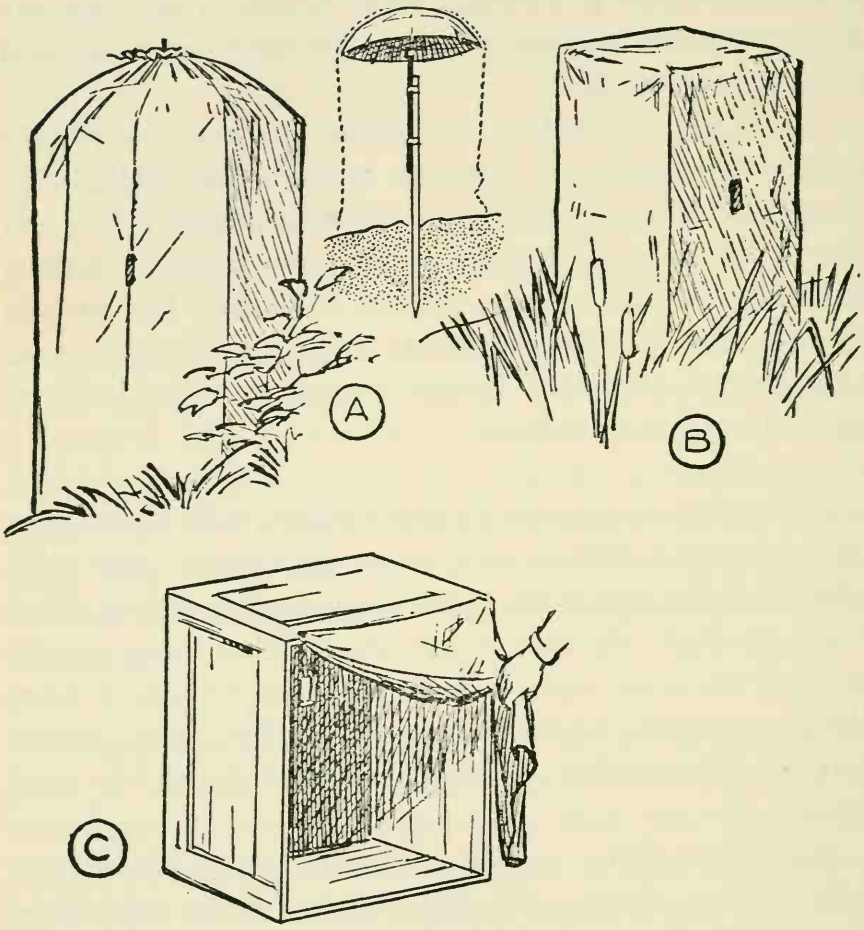
Sometimes you can talk by mechanical means, such as

through bird whistles, crow calls, duck calls, moose calls and so forth, which can be purchased at some sporting goods stores and Audubon stores. You need to practice a great deal with such calls so as to get the exact tones of a wild animal or bird.

Practicing just with your voice, you may be able to imitate the bark of a fox, the squall of a wildcat, the chattering of a red squirrel, or the whistling of a bird. By sitting perfectly still when you do it, you may bring these animals near you. If you put out food they like and sit quietly, they may become tame enough in time to come close to you, especially if they sense your friendship and no harm comes to them.

In the Panama jungle I often watched wild animals by hiding in dense clumps of ferns on the tops of small cliffs where I could look down into a creek canyon below. Since I was so high, my man scent was carried away by the breeze. To make myself doubly inconspicuous, I wore clothes colored like the ferns and rubbed these clothes with strong-smelling weeds so as to disguise the man scent.

Sometimes better results can be had by building carefully hidden blinds. The illustration on the next page shows three types of blinds. Notice that inside the blind there is a comfortable place for the man to sit or to lie, and that there are peep holes through which he can watch on all sides. It is necessary to get comfortable inside such a blind and then to be as still as possible. Use strong-smelling plants, rubbed on your clothes and body, to disguise the man scent. Clothes boiled in water with such plants do even better.



THREE TYPES OF BLIND

(A) Umbrella; (B) Collapsible Aluminum Pipe Frame Covered with Cloth; (C) Packing-Box

A spring in the desert or other dry country is a marvelous place to watch for wildlife, especially in the early morning or evening, as many animals come then to drink. Where there are numerous animal burrows is another good place to build a blind.

You may need to be quiet for a long time. The older a blind gets, the more used to it the animals become, until finally they will pay no attention to it at all.

Always keep a notebook handy when you are observing things in the wild. Write down in it the date, time, place, appearance of your surroundings and the state of the weather. The last is very important, as it often has a good deal to do with the feelings of the animals and what they will say to each other. Then, as animals and birds appear, begin to note in your notebook their various sounds and actions, trying to catch the emotions they express. Be very careful not to assume that your animals think the way you do.

Sometimes, of course, it is not possible to keep as full records in the field as you would like, because you must watch happenings closely or because the sound of the pencil is disturbing. In this case, write down everything you can remember as soon as you get home or back to camp. All such records can be very useful to science.

It is important for the true scientist to do a great deal of research into what other people have written about animals. It is also important to be cautious about believing everything they say. For example, the famous naturalist, Fabre, once stated that spiders are completely instinctive in all their actions, and can learn nothing from

experience. Later evidence has proven Fabre wrong. Be careful then about believing all I have written in this book, because I too could be wrong. Be careful; be scientific!

Bibliography

BOOKS THAT TELL ABOUT ANIMAL LANGUAGES IN GENERAL

The Animal Mind, by Conwy Lloyd Morgan. Longmans, Green, 1930

Animal Neighbors of the Countryside, by Joseph Wharton. Lippincott, 1938

Do You Speak Chimpanzee?, by Georg Schwidetsky. E. P. Dutton, 1933; George Routledge & Sons (London), 1932

King Solomon's Ring, by Konrad Z. Lorenz. Crowell, 1952

Kinship with All Life, J. Allen Boone. Harper & Bros., 1954

Our Desert Neighbors, by Edmund C. Jaeger. Stanford University Press, 1950

The Study of Instinct, by Nikalnas Tinbergen. Oxford University Press, 1951

This Fascinating Animal World, by Alan Devoe. McGraw-Hill, 1951

Ways of Nature, by John Burroughs. Houghton Mifflin, 1905

MAMMALS

American Mammals, by W. J. Hamilton, Jr. McGraw-Hill, 1939

The Dusky-footed Woodrat, by Jean Myron Linsdale and

Lloyd P. Tevis, Jr. University of California Press, 1951

Lives of Game Animals, by Ernest T. Seton. Doubleday, Doran, 1929

Mammals of Nevada, by Eugene Raymond Hall. University of California Press, 1946

Mammals of North America, by Victor H. Cahalane. Macmillan, 1947

Man Meets Dog, by Konrad Z. Lorenz. Houghton Mifflin, 1955

Talking to Animals, by Barbara Woodhouse. W. W. Norton, 1955

BIRDS

Birds as Individuals, by Len Howard. Doubleday, 1953

Crip, Come Home!, by Ruth Thomas. Harper & Brothers, 1952

Life Histories of North American Diving Birds, by Arthur C. Bent. Dodd, Mead, 1946

The Lives of Wild Birds, by Aretas A. Saunders. Doubleday, 1954

REPTILES, AMPHIBIANS, AND FISH

Amphibians and Reptiles of Western North America, by Robert C. Stebbins. McGraw-Hill, 1954

Field Book of Freshwater Fishes of North America North of Mexico, by Raymond M. Schrenkeisen. Putnam's, 1938

Field Book of Snakes of the United States and Canada, by Karl Schmidt and D. Dwight Davis. Putnam's, 1941

Handbook of Frogs and Toads, by Anna A. and Albert H. Wright. Comstock, 1949

Handbook of Lizards, by Hobart M. Smith. Comstock, 1946

Handbook of Salamanders, by Sherman C. Bishop. Comstock, 1943

Handbook of Turtles, by Archie Carr. Comstock, 1952

INSECTS AND RELATIVES

American Social Insects, by Charles D. Michener & Mary H. Michener. Van Nostrand, 1951
American Spiders, by Willis Gertsch. Van Nostrand, 1949
Bees, Their Vision, Chemical Sense, and Language, by Karl von Frisch. Cornell University Press, 1950
Near Horizons, by Edwin Way Teale. Dodd, Mead, 1942
Ways of the Ant, by John Crompton. Houghton Mifflin, 1954

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Vinson Brown is an insatiable explorer-naturalist. His thesis for his master's degree from Stanford University dealt with the distribution of reptiles and amphibians on the Pacific Coast. After two years of Army duty he organized and directed the Naturegraph Company, producing nature leaflets and nature records for schools and scouts. He is now at work on a complete guide to the ecology and distribution of the animals and plants of the West, but he also finds time to be a camp nature counselor and to farm a small ranch in Santa Clara, California, where he raises sheep, chickens, turkeys, rabbits, cattle, and walnuts.